Solutions Taking Shape.

INSTALLATION RESTORATION PROGRAM
PROGRAMMATIC HEALTH & SAFETY PLAN

FINAL

Prepared for:

AIR NATIONAL GUARD READINESS CENTER
3500 FETCHET AVENUE
ANDREWS AFB, MARYLAND

February 8, 1995

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
February '95

3. REPORT TYPE AND DATES COVERED
FINAL / FEB 95

4. TITLE AND SUBTITLE
Installation Restoration Program
Programmatic Health + Safety Plan

5. FUNDING NUMBERS

6. AUTHOR(S)
Ogden Environmental + Energy Services

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
ANGRC / CEVR
3500 FETCHET AVE.
ANDREWS AFB, MD 20331

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
SAME AS ABOVE

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
This document has been approved for public release and sale; its distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This document is a generic health and safety plan which can be used as a resource for all Installation Restoration Program field efforts for the Air National Guard. Site Specific documents will be produced for each ANG delivery order utilizing sections from this document, as well as, site specific data.

14. SUBJECT TERMS
Health + Safety Plan, HASP, IRP
ANGRC (Air National Guard Readiness Center)

15. NUMBER OF PAGES
150

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT

18. SECURITY CLASSIFICATION OF THIS PAGE

19. SECURITY CLASSIFICATION OF ABSTRACT

20. LIMITATION OF ABSTRACT

PROGRAMMATIC HEALTH AND SAFETY PLAN INTRODUCTION

This Programmatic Health and Safety Plan (HSP) has been prepared for use by Air National Guard Readiness Center (ANGRC) Installation Restoration Program (IRP) personnel, contractors, and subcontractors. The purpose of this Programmatic HSP is to provide personnel the information necessary to prepare project-specific Health and Safety Plans (HSP) in compliance with the Occupational Safety and Health Administrations (OSHA) Hazardous Waste and Emergency Response Standard 29 CFR 1910.120 and 29 CFR 1926.65. Additionally, the material presented herein is to be utilized for compliance projects including Resource Conservation Recovery Act (RCRA) and Underground Storage Tank (UST) projects.

The procedures detailed in this Programmatic HSP are for use as an aid in performing program and project related activities. Program level activities have been developed to standardize many health and safety and administrative procedures. Project level activities such as health and safety programs have been included for three reasons:

- To standardize procedures throughout the program;
- To enable site specific HSPs and other documents to be completed more efficiently; and
- To guide personnel performing project related activities.

This programmatic HSP has been developed to serve as management approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this programmatic HSP is not intended to obviate the need for professional judgment to accommodate unforeseen circumstances. Deviance from this programmatic HSP in planning or in the execution of planned activities must be approved by the ANGRC Project Manager and the Contractor Project Manager and documented.

This document has been prepared to provide and standardize procedures for conducting health and safety related activities. The applicable sections of these guidelines shall be followed unless prohibited by site specific conditions or other applicable statutes, rules or regulations. If a variance is necessary, the ANGRC project manager and the contractor project manager shall be contacted for approval. It is understood that the procedures outlined in this document cannot cover every event; however, these guidelines shall be used in all cases where appropriate.

PROJECT SPECIFIC HSP PREPARATION

The information herein is presented in a manner to streamline the preparation of project specific HSPs. This document is a companion document to the Ogden Health and Safety Management Plan and the ANGRCIRP Health and Safety Procedures Manual. The site-specific HSP has been developed in accordance with OSHA 29 CFR 1910.120 and has been streamlined so not to duplicate existing Ogden and ANGRC documents. ANGRC IRP Health and Safety procedures referenced in the HSP are presented in Section 2 of this manual. Project-specific HSPs are to be prepared in accordance with the following outline.

Site Specific Health and Safety Plan Outline

Emergency Contacts and Air Monitoring Action Levels
Map: Most Direct Route to Local Hospital
Emergency Response Plan

1.0 Introduction
- 1.1 Purpose and Policy
- 1.2 Applicability
  - 1.2.1 Modification of Plan
  - 1.2.2 Subcontractor Responsibilities
- 1.3 Site Location
- 1.4 Scope of Work
- 1.5 Health and Safety Planning
- 1.6 Responsibilities
- 1.7 Project Team Organization
  - 1.7.1 Project Manager
  - 1.7.2 Site Manager
  - 1.7.3 Site Safety Officer
  - 1.7.4 Field Team
- 1.8 Subcontractor's Safety Representative

2.0 Safety and Health Risk Analysis
- 2.1 Chemical Hazards
- 2.2 Physical Hazards
  - 2.2.1 Construction Hazards
  - 2.2.2 Heavy Equipment
  - 2.2.3 Noise Hazards
  - 2.2.4 Explosion
  - 2.2.5 Oxygen Deficient Atmospheres
  - 2.2.6 Heat/Cold Related Stress/Illness
  - 2.2.7 Prevention of Heat/Cold Related Stress/Illness

3.0 PERSONNEL PROTECTION AND MONITORING
3.1 Medical Surveillance
3.2 Site-Specific Training
3.3 Personal Protective Equipment and Action Levels
3.4 Monitoring Requirements
3.4.1 Routine Monitoring for Organic Vapors
3.4.2 Routine Monitoring for Explosive Environments
3.4.3 Oxygen Monitoring
3.4.4 Monitoring for Heat/Cold Stress/Illness
3.5 Background Readings
3.6 Data Logging
3.7 Dust Control
3.8 Personal Protective Equipment

4.0 SITE CONTROLS, MEASURES, ACCIDENT PREVENTION AND CONTINGENCY PLAN
4.1 Site Control Measures
4.2 Site Organization-Operation Zone
4.3 Work Zones
4.3.1 Exclusion Zone (Contamination Zone)
4.3.2 Contamination Reduction Zone
4.3.3 Support Zone
4.4 Safe Work Practices
4.5 Health and Safety Equipment Checklist
4.6 Accident Prevention
4.6.1 Health Equipment Operation
4.6.2 Sampling Practices
4.7 Site Security
4.8 Communication
4.9 Contingency Plan
4.9.1 Chemical Exposure
4.9.2 Personal Injury
4.9.3 Evacuation Procedures
4.10 Decontamination Procedures
4.10.1 Decontamination - Medical Emergencies
4.10.2 Decontamination of Tools
4.10.3 Heavy Equipment Decontamination
4.11 Places of Refuge
4.12 Fire
4.13 Safety Eyewash
4.14 Incident Report
4.15 Operation Shutdown
4.16 Spill or Hazardous Materials Release
4.17 Community Safety

4.18 Training and Medical Surveillance
4.19 Recordkeeping
Tab 1: Plan Acceptance Form, Accident Request Form, Job Safety and Health Protection Notice
Tab 2: Material Safety Data Sheets for Site

LIST OF FIGURES

A-1 Most Direct Route to Local Hospital
A4.3 Work Zones and Decontamination Zones

LIST OF TABLES

A2.1 Toxicological Properties of Compounds
A3.1 Suggested Frequency of Physiological Monitoring for Workers

The following document is the template for a site specific HSP. Each section which requires site specific information informs personnel of the type of information required.

TABLE OF CONTENTS

PROGRAMMATIC HEALTH AND SAFETY PLAN

SECTION I - SITE-SPECIFIC HEALTH AND SAFETY PLAN

SECTION II - HEALTH AND SAFETY PROCEDURES

HEALTH AND SAFETY PLAN

(________)

FOR

____

____

____

____

Prepared for:
ANGRC IRP

Prepared by:

Ogden Environmental and Energy Services, Co., Inc.
3325 Perimeter Hill Drive
Nashville, Tennessee 37211

(month) 1994

HEALTH AND SAFETY PLAN (______)

FOR

(TYPE OF INVESTIGATION)
AT (NAME OF SITE)
LOCATION
STATE

Prepared for:
ANGRC

REVIEW AND APPROVALS:

Prepared by:

Environmental Scientist	Date

Approved by:

Health and Safety Manager	Date
Corporate Health and Safety Manager	Date
PROGRAM Manager	Date

This Site-specific Health and Safety Plan has been developed in accordance with OSHA 29 CFR 1910.120 and 29 CFR 1926.65 and has been streamlined so not to duplicate existing Ogden documents, as requested by the Air National Guard. This document is a companion document to the Ogden Health and Safety Management Plan, ANGRC IRP, which resides onsite with the OHSC and with Ogden Subcontractors, and the Air National Guard.

TABLE OF CONTENTS

SECTION	PAGE
List of Acronyms	a-i
INTRODUCTION	
General Information	
Site Description and Features	
Background/Site History	
Scope of Work/Planned Site Activities	
Scheduled Onsite Personnel	
Personnel Responsibilities	
HAZARD EVALUATION	
Chemical Exposure	
Hazard Analysis of Site Work Tasks and PPE	
PERSONNEL PROTECTION	
Administrative Controls	
Training Assignments	
Medical Surveillance Requirements	
Certifications	
Safe Work Practices	
Sanitation and Illumination	
Recordkeeping	
Engineering Controls	
Barriers	
Containments	
Dust Suppression	
Rinseate Collection	
Personal Protective Equipment (PPE)	
PPE Donning/Doffing Procedures	
SITE CONTROL	
Site Security	
Visitor Access	
Work Zones	
Other	

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

- Communications
- AIR SURVEILLANCE
  - Exposure Monitoring
  - Equipment
  - Laboratory Analyses
- DECONTAMINATION PROCEDURES
  - Personnel Decontamination
  - Heavy Equipment Decontamination
  - Disposal Procedures
  - Emergency Decontamination
- EMERGENCY RESPONSE
  - Pre-planning and General Procedures
  - Site-Specific Response Scenarios
    - Natural Disasters
    - Injury to Project Personnel or Visitors
    - Spill of Hazardous Materials
    - Fire or Explosion
    - Accident Reporting and Recordkeeping
  - Bloodborne Pathogen Exposure Control Plan
- Emergency Reference List
  - Medical Emergencies
  - Emergency Services
  - Call List
  - Emergency Equipment
- HEALTH AND SAFETY PLAN ACCEPTANCE

LIST OF FIGURES

Number	Title	Page
1	Site Location Map	
2	Site Map	

LIST OF FIGURES (Continued)

Number	Title	Page
3	Work Zones	
4	Hospital Route Map	

LIST OF TABLES

Number	Title	Page
1	Overview of the Contaminants of Concern	
2	Chemical Properties and Exposure Assessment	
3	Summary of Physical and Operating Safety Hazards	
4	Summary of Initial Assignments of Protection Levels, Training and Medical Surveillance for Site Work Tasks	
5	Action Levels	

LIST OF APPENDICES

Number	Title
1	MSDSs and Selected Chemical Data Sheets
2	Project Forms
	a) Daily Tailgate Safety Meeting Report
	b) Visitor Health and Safety Orientation
	c) Subcontractor Health and Safety Orientation
	d) Equipment Calibration Log
	e) Site Air Surveillance Record
	f) Workplace Monitoring Exposure Form
	g) First Aid Incident Report
	h) Hepatitis B Vaccine Declination
	I) Incident Report

LIST OF APPENDICES (Continued)

Number	Title
	k) Record of Change
	l) OHSC Biweekly Report
	m) Employee/Visitor Daily Roster

3. Justification of PPE Levels
4. Drilling and Heavy Equipment Operation Safety Guidelines
5. Trenching and Excavation Safety Guidelines

LIST OF PROCEDURES

HSP-1 Accident Reporting
HSP-2 Confined Space
HSP-3 Heat Stress
HSP-4 Respiratory Protection
HSP-5 Hearing Conservation
HSP-6 Personnel Decontamination
HSP-7 Drilling Safety
HSP-8 Sampling for Organic Vapors and Gases
HSP-9 Sampling for Airborne Particulates
HSP-10 OSHA Compliance Visit
HSP-11 Excavation, Trenching, and Shoring
HSP-12 Removal of Underground Storage Tanks
HSP-13 Control of Hazardous Energy Sources
HSP-14 Safety Task Assignment
HSP-15 Signs, Signals and Barricades
HSP-16 Fall Protection and Prevention
HSP-17 Temporary Facilities

FP-1 Control of Measuring and Test Equipment
FP-2 Calibration Procedures

LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Government Industrial Hygienists
AST	Aboveground Storage Tank
AVGAS	Aviation Gasoline
bgs	Below Ground Surface
Bla	Bladder
Blo	Blood
Cart.	Cartridge
cc	cubic centimeter
CD	Civil Defense
CFR	Code of Federal Regulations
CNS	Central Nervous System
CPR	Cardio-Pulmonary Resuscitation
CRZ	Contamination Reduction Zone
CV	Cardiovascular
dBA	Decibels (A-weighted scale)
decon	Decontamination
DOSH	(State) Department of Occupational Safety and Health
DOT	Department of Transportation
EC	Emergency Coordinator
EM	Electromagnetic
Encap	Encapsulating
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Emergency Services Account (PWC)
eV	Electronvolt
EZ	Exclusion Zone
f/cc	Fibers per cubic centimeter
FM	Field Manager
FP	Field Procedure
FT	Field Trailer
ft	foot/feet
GFCI	Ground Fault Circuit Interrupter
GPR	Ground Penetrating Radar
gw	Ground Water
HBV	Hepatitis B Virus
HIV	Human Immunodeficiency Virus (AIDS)
Hrt	Heart
H&S	Health and Safety
HSM	Health and Safety Manager
HSMP	Health and Safety Management Plan
HSP	Health and Safety Plan

LIST OF ACRONYMS AND ABBREVIATIONS

H:V	Horizontal to Vertical
IDLH	Immediately Dangerous to Life and Health
IDW	Investigative-Derived Waste
IP	Ionization Potential (eV)
IPA	Isopropyl Alcohol
Kid	Kidney
lbs	Pounds
LEL	Lower Explosive Limit
Liv	Liver
mg/m^3	Milligrams (contaminant) per cubic meter (air)
Mod.	Modified
MOGAS	Motor Gasoline
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
OHSC	Onsite Health and Safety Coordinator
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer (FID)
OV/AG	Organic Vapor/Acid Gas
OVM	Organic Vapor Monitor (PID)
PAH or PNA	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene (a.k.a. Perchloroethylene)
PE	Polyethylene
PEL	Permissible Exposure Level (OSHA)
PID	Photoionization Detector
PMO	Program Management Organization
PM10	Particulate Matter <10 microns
PPE	Personal Protective Equipment
PPM	Project Procedures Manual (ANGRC IRP)
ppm	parts per million
Pros.	Prostate
Purif. Resp.	(Air) Purifying Respirator
QA/QC	Quality Assurance/Quality Control
RA	Removal Action
Resp.	Respiratory System
ROC	Record of Change (HSP)
RPM	Remedial Project Manager (formerly EIC)
SAP	Sampling and Analyis Plan
SOP	Standard Operating Procedure

LIST OF ACRONYMS AND ABBREVIATIONS

STEL	Short Term Exposure Limit
SVOC	Semi-volatile Organic Compound
SZ/CZ	Support Zone/Clean Zone
TBD	To Be Determined
TCE	Trichloroethylene
TLV	Threshold Limit Value (ACGIH)
TPH	Total Petroleum Hydrocarbons
TVH	Total Volatile Hydrocarbons
TZ	Transition Zone
UEL	Upper Explosive Limit
UST	Underground Storage Tank
V	Vehicle
VC	Vinyl Chloride
VOC	Volatile Organic Compound

GENERAL INFORMATION:

Project #:

ANGRC PM:

Site Name & Location:

ANGRC PM's Tel. #:

Field Manager:

Program Manager: E. Griff Wyatt

Mobile Tel.#: To Be Determined (TBD)

Point of Contact (POC) onsite:

(See also Emergency Call List)

SITE DESCRIPTION AND FEATURES: Useful or required references: Work Plan (WP), Sampling & Analysis Plan (SAP), pre-work meeting minutes, site reconnaissance report, relevant historical data/reports, clean copies of location and site maps.

(State the name and exact location of the site. Present a generalized discussion of the location and source of potential or confirmed site contaminants. Note any land features, potential safety hazards or logistical considerations such as: drainage ditches/cliffs, streams/ponds, terrain homogeneity, stability and slope, obstacles to entry/exit, conditions of site structures, and etc., which may impact accessibility to foot, vehicular and heavy equipment traffic/mobilization. Note any indications of actual or potential IDLH (inhalation) or other dangerous conditions, such as: standing pools of liquids, deteriorated structures/buildings, proximal AST/USTs, high voltage lines, biological indicators, confined spaces, open holes/excavations, etc., Note general climatic/meteorological conditions such as: prevailing wind speed and direction, rainy season, humidity, and average temp. w/ranges, if known. Note any sensitive adjacent populations/communities such as: operating facilities, churches, neighborhoods, wildlife refuges, etc. Finally, it should be noted if there will be an onsite trailer, and if utilities (power, water) are accessible to the site or if other arrangements (generators, water trucks/tanks) have been made.

BACKGROUND/SITE HISTORY: Useful or required references: WP, SAP, pre-work meetings, site reconnaissance report, relevant historical reports:

(List the owner/operator of the site/facility. Give a detailed description of the activities/operation(s) (contamination sources) that occurred; duration of activities/operation(s); and current operating status (operating/in-use, closed, torn down, removed, etc.). Estimate of location (surface/subsurface) , type and quantities of site contaminants/wastes, and the suspected matrix in which located (ground/surface water, soils). If dealing with tanks, be sure to note if they are ASTs/USTs, in-service/out-of-service, leaking/not leaking/unknown, quantity of specific contents, raw product/waste material, tank materials (fiberglass, steel), and location of appurtenances and utilities (above ground/below ground). Note previous investigations and conclusions; present summary of important soil, water and air sampling/field measurement results.

SITE LOCATION MAP

(An area map usually found in WP or SAP)

SITE MAP

(Usually found in SAPs showing exact sampling locations)
(More than one "site map" may be required. Use this map to locate work zones and emergency refuge areas. Note the prevailing wind direction)

SCOPE OF WORK/PLANNED SITE ACTIVITIES:

The goal of this (type of investigation) is to (take project objective from WP/SAP). It is anticipated that the project will run for a duration of approximately (_____) months, with the initial field investigation lasting (__) weeks. Planned site activities include the following tasks, listed in the sequence of occurrence: (Define all work tasks and specific methods of accomplishing each task, include the #, dimension and depths of sampling/drilling/trenching locations. Note if excavations, or any confined space, will be entered by personnel. (Ex Tasks:)

1. Land survey of buildings and structures (Phase I).
2. Geophysical survey for location of underground utilities using ground penetrating radar (GPR) and Electromagnetic (EM) techniques.
3. Soil Gas Survey of 45 sample locations between 6-12 ft. below ground surface (bgs) to locate insitu concentrations of soil gas and to establish trenching and boring locations.
4. Collection of soil samples at 24 locations using a truck-mounted hollow stem (6") auger drill and split-spoon sampling. Total depth of the borings are: one to 50 ft. bgs (background), three to 100 ft. bgs, and twenty to a depth of 50 ft. bgs. Ground water is at approximately 85-90 ft. bgs.
5. Trenching with a backhoe to a depth of 4-6 ft. bgs at six unpaved locations and soil sampling. Personnel entry into the trench is not anticipated or recommended.
6. Sampling and heavy equipment decontamination using a steam cleaner and a process of detergent wash, water rinse, solvent rinse, water rinse, and deionized water rinse per the SAP.
7. Management of investigation-derived waste (IDW), including collection, segregation, labeling, handling, and inventorying of drums containing generated wastes and sample spoils.
8. Land survey of sampling locations (Phase II).
9. Underground Storage Tank (UST) Removal Activities.

SCHEDULED ONSITE PERSONNEL:*

Name	Company	Project Title
	Ogden	Program Manager
	Ogden	Field Manager/Geologist
	Ogden	Field Technician
	Ogden	Onsite H&S Coordinator
TBD	TBD	Geophysical Surveyor
TBD	TBD	Soil Gas Surveyor
TBD	TBD	Drillers
TBD	TBD	Excavator
TBD	TBD	Land Surveyor

* Note that all personnel arriving or departing the site should log in and out on the Daily Employee/Visitor Roster (Appendix 2). Substitutions will be made with similarly qualified personnel; the Site Certification letter must reflect all personnel changes. All personnel requiring access to controlled work areas must have completed the training and medical administrative control requirements.

PERSONNEL RESPONSIBILITIES

Onsite Health and Safety Coordinator (OHSC). Reports jointly to the Health and Safety Manager (HSM) and the Field Manager (FM) for all aspects of the project and is the primary contact for health and safety during all field activities. Establishes work zones, evacuation routes, and assembly areas. Makes the ultimate decision to modify levels of protection provided in the HSP based on site conditions or monitoring data. Serves jointly with the FM as Emergency Coordinator (EC). Has the authority to stop all work if conditions are judged to be hazardous to onsite personnel or the public, and reports and investigates accidents and near-misses. Other specific responsibilities are detailed within section 3 of the Health and Safety Plan (HSP). Revise HSP when necessary via coordination with Safety and Health Manager and documents changes on Record of Change form. Responsible for onsite briefing HSP to employees prior to commencement of work.

The OHSC or designee must carefully document the implementation of this HSP by maintaining the Project specific Health and Safety Field Binder and Project Files. The Field Binder will contain the following documents; all blank forms* are provided in Appendix 2 to this HSP:

- Certification letter(s) of medical and training requirements (prepared by HSM)
- Signed acceptance sheet of this HSP (signed by all routine onsite personnel)
- Safety inspection records including violations and remedial action plans
- Health and safety notations made in the Site Log Book that is held by the FM

* Daily Employee/Visitor Roster
* Signed Visitor and Subcontractor Health and Safety Orientation Forms
* Signed Daily Tailgate Safety Meeting Reports
* Equipment Calibration Records
* Air Surveillance Records
* Workplace Monitoring Exposure Records
* Supervisor's First Report of Injury
* First Aid Incident Reports
* Incident Report (for environmental incidents, equipment damage, and work stoppages)
* Completed Record of Changes (ROCs) to this HSP
* Completed Biweekly OHSC Summary Reports

The responsibilities of the Program Manager include the following:

- Interpretating the safety requirements as outlined in the Statement of Work and communication of these requirements to responsible project participants

- Allocating the resources necessary to implement the plan during the duration of the project

- Furnishing the approved plan to subcontractors for their use.

The Program Manager has the full responsibility for implementing and executing an effective program of employee protection and accident prevention. The Program Manager may delegate authority to expedite and facilitate any application of this program. Strong support and active participation by the Program Manager is an essential element in a successful health and safety program.

Project Manager

The responsibilities of the Project Manager include the following:

- Review and approve the SSHSP
- Coordinate with the Health and Safety Officer (HSO) to verify that health and safety activities are properly performed
- Designate the availability of company resources for the implementation of necessary aspects of the plan
- Delegate appropriate activities and responsibilities to site personnel as required.

Health and Safety Manager (HSM). Responsible for the review and approval of the HSP and coordinating the implementation of health and safety procedures. Responsible for approval of all changes made to this HSP.

Field Manager (FM). Has ultimate responsibility for project health and safety, including correcting unsafe acts or conditions, enforcing procedures, and conducting daily tailgate meetings. Serves as primary EC in emergency situations. Also responsible for assuring the submittal of the Supervisor's Report of Accident and First Aid Incident Report (Attachment 2) to the HSM within 24 hours of an incident.

Technical Staff. All Ogden and subcontracting personnel are responsible for compliance with this HSP in its entirety. They are responsible for taking all reasonable precautions to prevent injury to themselves and to their fellow employees and for being alert to potentially harmful situations. Technical staff are expected to perform only those tasks which they believe can be done safely and to immediately report any accidents, near misses and/or unsafe conditions to the OHSC or the FM.

Subcontractors. Responsible for the conduct of personnel while onsite and ensuring their compliance with this HSP. Notifying the OHSC of any special medical conditions (ie. allergies, diabetes, etc.). Correcting any unsafe acts/conditions that are identified by the FM or OHSC.

The project organizational chart is presented in Figure 1-1.

HAZARD EVALUATION

Chemical and physical and operating safety hazards anticipated during this project will be evaluated during subsequent tables and sections. The tables provide the details which support the task specific hazard analyses. Table 1 provides a general overview of the contaminants of concern, Table 2 provides chemical properties and exposure assessment data, and Table 3 summarizes the physical and operating safety hazards and control measures identified for this project. A complete hazard analysis of each site work tasks, including a relative risk ranking, and the list of protective measures completes this section of Hazard Evaluation. Further details of specific control measures for these hazards will be presented under the section heading: Personnel Protection.

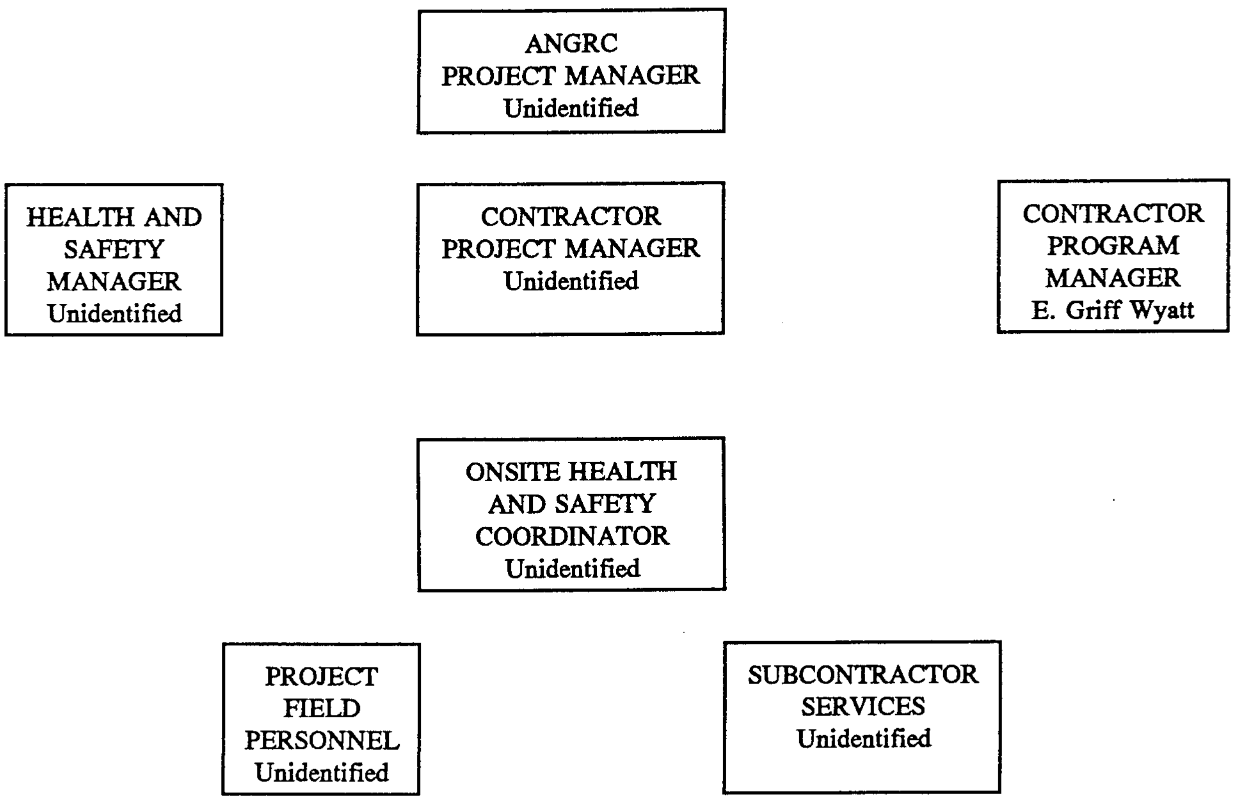
CHEMICAL EXPOSURE

The primary entry routes of potential contaminants and hazardous materials onsite include: Inhalation of vapors and dusts; skin contact with contaminated materials; and ingestion of airborne dusts, or materials from hand-to-mouth contact due to inadequate personal hygiene. In order to minimize these exposure pathways, dust suppression techniques will be employed by the onsite subcontractor and the OHSC will periodically monitor for airborne contaminants in the work and perimeter areas. In addition, all required PPE as specified in the Hazard Analysis of Site Work Tasks Section will be worn and personal hygiene will be carefully monitored.

The following contaminants of concern under investigation may be present at the site:

•	•
•	•
•	•
•	•
•	•

FIGURE 1-1
PROJECT ORGANIZATION CHART



-
-
-
-

Table 1 provides a general overview of these contaminants, including their origin, hazardous properties, and likely current physical state in the environment. Table 2 summarizes the chemical properties important for exposure assessment and for identification of IDLH conditions.

In addition to the contaminants of concern, the following hazardous substances are anticipated to be brought onsite to supplement investigation activities:

- Isopropyl alcohol (IPA)
- Alconox detergent
- Gasoline
- Diesel
- Calibration gases
- Other(s) ____________________
  ____
  ____
  ____
  ____

These hazardous substances are subject to the Hazard Communication Standard; required Material Safety Data Sheets (MSDSs) are presented in Appendix 1. This list must be updated and MSDSs obtained and filed for any other hazardous substances brought onsite. For additional reference, see the Hazard Communication Written Program, HS-2, Corporate Injury and Illness Prevention Program.

Table 1
Overview of the Contaminants of Concern

ANTICIPATED PHYSICAL STATE:		
( ) Liquid (soils, gw)	( ) Sludge	( ) Unknown
( ) Solid	( ) Gas/Vapors (soil)	
POTENTIAL HAZARDOUS PROPERTIES:		
( ) Corrosive	( ) Flammable	( ) Radioactive
( ) Toxic	( ) Volatile	( ) Reactive
( ) Inert	( ) Carcinogenic	( ) Unknown
( ) Asphyxiant		
CONTAINER/STORAGE SYSTEM INFORMATION:		
( ) Tanks __________	( ) Landfills/Dumps	( ) Surface
( ) Drums __________	( ) Impoundments	( ) Subsurface
( ) Pipes __________	( ) Other ____________	( ) Uncontainerized (former tanks)

Table 1 (Continued)
Overview of the Contaminants of Concern

ORIGIN OR INDUSTRIAL APPLICATION OF CHEMICALS OF CONCERN :

Chemicals

( ) Acids	( ) Metals	( ) Phenols
( ) Caustics	( ) Pesticides	( ) Paints
( ) Halogen	( ) PCBs	( ) Solvents (type)

( ) Other: ____________________

Oils/Fuels

( ) Fuel Oil	( ) AVGAS	( ) MOGAS

( ) Other: ____________________

Sludges

( ) Metal sludges	( ) Oily sludges	( ) Septic sludges

( ) Other: ____________________

Solids

( ) Asbestos	( ) Landfill refuse	( ) Tailings

( ) Other: ____________________

NOTES: ____________ solvents include:

Chemical Hazard Table 2

Chemical Hazard Table 2

Chemical Hazard Table 2

Table 3
Summary of Physical and Operational Safety Hazards

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Physical hazards associated with drill rigs and other heavy equipment	• See also Appendix 4, Standard Safe Work Practices for Heavy Equipment Operations;; Drilling Safety SOP HSP-7, PPM. • Equipment will be inspected on a daily basis by the owner/operator, daily logs will be maintained. All discrepancies shall be corrected prior to placing the equipment in service. • Blades, buckets and other heavy equipment will be kept fully lowered when not in use; parking brakes must be engaged. • Drill rods or core barrels shall not be left balancing, leaning, or otherwise unsecured on the rig. • Equipment parked on inclines shall have the wheels chocked and the parking brake set. • Equipment shall not be used on unstable or unsafe inclines. • Increase communication effectiveness with operators using hand signals, radios (as appropriate), and line-of-sight confirmation.
Entanglement in rotating or moving equipment	• Equipment shall not be operated without guards. • Loose-fitting or dangling clothes, hair jewelry are prohibited. • Stay clear of rotating augers and pinch points, such as cables and pulleys. • Passage under, or stopping over, a moving stem or auger is prohibited. • Drill crews are not allowed on the mast while the drill bit/auger is in operation or during transport. • Long-handled shovels will be used to move cuttings from the auger. • The drill crew and the OHSC will be aware of the location and proper operation of the rig's emergency shut-down equipment (kill-switches, etc.), and procedures.
Back injuries due to improper lifting of drums, augers, etc.	• Workers will use proper lifting techniques, lifting with the legs and not the back. Loads >50 lbs. require a second person or mechanical device. • When ever possible, mechanical devices such as drum dollies, hand trucks and tool hoists (for lifting augers) should be used to lift or move heavy loads.
Slips, trips and falls	• Clear work area of obstructions and debris prior to rig set-up. • Level and stabilize the rig prior to raising the mast. • Keep drill platforms, stairs, and immediate work areas clear; do not allow oil/grease and excessive mud to accumulate in these areas. • The discharge of drilling fluids and foam will be channeled away from the work area to prevent ponding or slippery conditions. • A safety harness and life-line shall be provided and its use required for each employee working >6 ft. above the platform or main work deck. • Open boreholes should be immediately backfilled, or be capped and flagged; open excavations will be barricaded or be covered with steel traffic plates. • Wherever possible, slip, trip and fall hazards will be eliminated or clearly identified with caution tape, barricades, or equivalent means.

Table 3 (Continued)
Summary of Physical and Operational Safety Hazards

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Noise	• Hearing protection shall be worn during operation of heavy equipment, pneumatic power tools, steam cleaners and other equipment generating >85 dBA. • See also Hearing Conservation SOP, HSP-5, PPM.
Biological agents	• Workers will not be exposed to infectious agents or wastes with the current scope of work; however, responders to first-aid incidents may contact bloodborne pathogens, and will follow the Bloodborne Pathogen Control Plan in this HSP. • Workers shall be protected from hazards of irritant and toxic plants and be suitably instructed in the first-aid treatment available. • Personnel with known reactions to insect bites or stings should be identified during the "kick-off" meeting so that the appropriate emergency treatment can be made available onsite. • Workers should not attempt to capture any wild or semi-wild animals due to the possibility of a bite or parasitic infection.
Fire and explosion	• ABC fire extinguishers must be accessible in the work area. • Flammables must be stored in UL and OSHA approved safety cans with spark arrestors. • Flammable containers must be stored >50 ft. from the rig; portable (flammable) tanks must be >100 ft from the rig. • The exhausts of equipment powered by internal combustion engines will be located well away from flammables and combustibles. • Hot work permits/approvals must be secured prior to welding or cutting. • Compressed gases must be stored and used in a safe manner. • Equipment, e.g., generators, shall not be refueled while in operation, or while hot enough to ignite fuel vapors. • Operations which pose fire hazards should be conspicuously marked: "No Smoking or Open Flames".
Electrocution	• Locate all overhead and underground power lines by geophysical methods (as feasible); reviewing engineering drawings; and by discussion with appropriate activity and/or PWC personnel. Confirm exact location of lines with hand tools, not heavy equipment; worker(s) should wear rubber insulated protective gloves. • Lower the drilling mast prior to moving the rig any distance. • Lock-out and tagging of controls that are to be deactivated for maintenance/work on energized or de energized equipment or circuits.

Table 3 (Continued)
Summary of Physical and Operational Safety Hazards

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Electrocution (Continued)	• Extension cords, power/electric tools, pumps, floodlights and generators that are not doubly insulated must have functional grounding conductors. • Ground fault circuit interrupters (GFCIs) must be used on all 120-volt, 120-amp circuits. • The minimum distance required between drilling masts and overhead power lines <50 kv is 15 ft, unless the lines have been de-energized and visibly grounded at the point of work; or be equipped with insulated barriers to prevent physical contact. • Site work will not be conducted with imminent lightning storms. • Romex/Type NM cable shall not be used for extension cords.
Exploding ordnance	With an encounter of suspected or detected explosive ordnance: • Stop work. • Mark suspected/confirmed explosive ordnance with tape, traffic cone, or other easily visible marker. • Evacuate the area at least 100 ft. from the ordnance, as possible. • If on-base, call base ( ). • If off-base, call ( ).. • Conduct a Visitor Health & Safety Orientation and escort visitor to marked area. • Complete an Incident Report (Appendix 2) within 24-hrs. for all work shut-downs.
Excavation/Trench collapse or cave-in	• Whenever possible, workers shall not enter trenches or test pits to collect samples, but use remote equipment or devices, e.g., backhoe buckets, hand augers, shovels, or equivalent. • If entry is required, then the procedures in the Trenching and Excavation Safety Guidelines (Appendix 5) and excavation, trenching, and shoring procedures will be followed, including use of: OSHA sloping or shoring; a "competent" person to inspect trench prior to entry; emergency retrieval systems, safe ladders and use of a confined space entry permit as required to ensure safe atmospheres. • All simple slopes in excavations <20 ft. shall have a maximum allowable slope of 1-1/2:1 (H:V) or 34° as measured from the horizontal. • Excavated materials will be stored >2 ft. from the edge and/or have retaining devices. • All trenches/excavations shall be properly signed and barricaded to restrict unauthorized pedestrian and vehicular traffic. • Unattended open trenches are prohibited, and should be back-filled upon completion or be covered by steel traffic plates.
Heat stress	• See the Heat Stress Prevention SOP HSP-3, PPM. • Workers will be trained to recognize signs and symptoms of heat illnesses. • Provide shelter or shaded area for work tasks (as feasible) and break areas. • Adjust work schedules by rotation of personnel or alternate job functions to minimize heat stress or overexertion at one task. • Perform work during cooler hours of the day (or night) as feasible.

Table 3 (Continued)
Summary of Physical and Operational Safety Hazards

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Heat Stress (Continued)	• Maintain normal body fluid levels by consuming 16 oz. (2 cups) of water prior to shift and about 8 oz (1 cup) every 15-20 minutes. Two gallons of water should be consumed over an 8 hour period. • Wear loose-fitting cotton clothing, e.g., medical scrubs, and cotton undergarments under PPE to absorb moisture and to help prevent heat rash. • As feasible, provide field "showers" or hose-down areas to cool down body.
Inclement weather	Work shut-down conditions: • Poor visibility. • Precipitation severe enough to impair safe movement or travel. • Lightning in the immediate area. • Steady winds >40 mph. • Other conditions as determined by the OHSC, FM or HSM. • Imminent threat of severe tropical storm or hurricane.
Oxygen deficiency	• Prior to personnel entry for work, a "competent" person shall test trenches and other confined spaces for oxygen deficient atmospheres, defined as <19.5% oxygen by volume in air (see also Table 5 of this HSP). • Whenever equipment powered with internal combustion engines (rigs, backhoes, generators, etc.) are used in enclosed spaces, atmospheres will be tested for LEL/O_2, as well as carbon monoxide and hydrocarbons. • See also Confined Space Entry SOP, HSP-2, PPM and the Excavation, Trenching and Shoring Procedures (Appendix 5).
Key:	EOD = Explosive Ordnance Division FP = Field Procedure GFCI = Ground Fault Circuit Interrupter HSP = Health and Safety Plan HSP-1 = Health and Safety Procedures - # OHSC = Onsite Health and Safety Coordinator PPM = Project Procedures Manual (ANGRC IRP) SOP = Standard Operating Procedure UL = United Laboratories

HAZARD ANALYSIS OF SITE WORK TASKS

Task Name: Land Survey of Buildings and Structures (Phase I)

Potential Hazards: (Check all that apply to either existing conditions or that result from site operations)

( ) Rotating Machinery	( ) Projectiles	( ) Confined Space
(√) Heat Stress	(√) Physical Exertion	(√) Biological (insects)
( ) Cold Stress	( ) Noise (>85 dBA)	( ) Electrical (utilities)
( ) Heavy Equipment	(√) Vehicle Traffic	( ) Chemical Exposure
( ) Intrusive Activ's (underline)	( ) Fire/Explosion (underline)	(√) Other (List)
• Drilling	• Flam. Materials	Slips, trips, and falls.
• Soil Vapor Surv.	• Low-lying Areas	____
• Sampling	• Fuel lines	____

Relative Risk Ranking: (√) Low ( ) Moderate ( ) High ( ) Undetermined

Control or Protective Measures:

(√) Tailgate Meetings	(√) PPE, Level D	( ) Air Monitoring
(√) Operator Training	( ) Site Control	( ) Decontamination

( ) Engineering Controls:
(√) SOPs: Heat Stress Prevention (HSP-3).
(√) Other: Maintain supply of cool fluids, sunscreen, and insect repellent onsite; stay clear of visually contaminated areas; wear reflective protective traffic vests.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the OHSC. Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

LEVEL OF PROTECTION:	( ) A ( ) B	( ) C (√) D	( ) Modified D
RESPIRATOR: (Level C and above)	( ) SCBA, Airline ( ) OV/AG Cart.	( ) Purif. Resp. ( ) Other ____	( ) Escape Mask
PROTECTIVE CLOTHING:	( ) Encap. Suit ( ) Saranex	( ) Tyvek ( ) Splash Suit	( ) PE Tyvek ( ) Other ____
HEAD/EYE/EAR:	( ) Hard Hat ( ) Splash Shield	(√) Safety Glasses ( ) Ear Plugs/Muffs	( ) Goggles ( ) Other ____
GLOVES: (outer) (inner)	( ) Nitrile ( ) Latex	( ) Neoprene ( ) Vinyl	( ) PVC ( ) Other ____
FOOTWEAR:	(√) Steel-toed Leather ( ) Steel-toed Rubber	( ) Overboots ( ) Other ____	

Modifications Permitted: Steel-toed rubber boots may be substituted for steel-toed leather boots.

Task Name: Geophysical Survey Using GPR and EM Techniques

Potential Hazards: (Check all that apply to either existing conditions or that result from site operations)

( ) Rotating Machinery	( ) Projectiles	( ) Confined Space
(√) Heat Stress	(√) Physical Exertion	(√) Biological (insects)
( ) Cold Stress	( ) Noise (>85 dBA)	( ) Electrical (utilities)
( ) Heavy Equipment	(√) Vehicle Traffic	( ) Chemical Exposure
( ) Intrusive Activ's (underline)	( ) Fire/Explosion (underline)	(√) Other (List)
• Drilling	• Flam. Materials	Slips, trips, and falls.
• Soil Vapor Surv.	• Low-lying Areas	
• Cone Penetrom. Surv.	• Fuel lines	
• Sampling		

Relative Risk Ranking: (√) Low ( ) Moderate ( ) High ( ) Undetermined

Control or Protective Measures (see also Table 3):

( ) Tailgate Meetings	(√) PPE, Level D	( ) Air Monitoring
(√) Operator Training	( ) Site Control	( ) Decontamination

( ) Engineering Controls: ____

(√) SOPs: Heat Stress Prevention (HSP-3).

(√) Other: Maintain supply of cool fluids, sunscreen, and insect repellent onsite. Use reflective safety vests.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the OHSC. Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

LEVEL OF PROTECTION:	( ) A	( ) C	( ) Modified D
	( ) B	(√) D	
RESPIRATOR:	( ) SCBA, Airline	( ) Purif. Resp.	( ) Escape Mask
(Level C and above)	( ) OV/AG Cart.	( ) Other Cart. ____	
PROTECTIVE CLOTHING:	( ) Encap. Suit	( ) Tyvek	( ) PE Tyvek
	( ) Saranex	( ) Splash Suit	( ) Other ____
HEAD/EYE/EAR:	( ) Hard Hat	(√) Safety Glasses	( ) Goggles
	( ) Splash Shield	( ) Ear Plugs/Muffs	( ) Other ____
GLOVES: (outer)	( ) Nitrile	( ) Neoprene	( ) PVC
(inner)	( ) Latex	( ) Vinyl	( ) Other ____
FOOTWEAR:	(√) Steel-toed Leather	( ) Overboots	
	( ) Steel-toed Rubber	( ) Other ____	

Modifications Permitted: Steel-toed rubber boots may be substituted for steel-toed leather boots.

Task Name: Soil Gas Survey of 45 locations between 6-12 ft bgs; onsite analysis

Potential Hazards: (Check all that apply to either existing conditions or that result from site operations)

( ) Rotating Machinery	( ) Projectiles	( ) Confined Space
( ) Heat Stress	(√) Physical Exertion	(√) Biological (insects)
( ) Cold Stress	(√) Noise (>85 dBA)	(√) Electrical (utilities)
(√) Heavy Equipment	( ) Vehicle Traffic	(√) Chemical Exposure
(√) Intrusive Activ's (underline)	( ) Fire/Explosion (underline)	(√) Other (List)
• Drilling	• Flam. Materials	Slips, trips, and falls.
* Soil Vapor Surv.	• Low-lying Areas	
• Cone Penetrom. Surv.	• Fuel lines	
• Sampling		

Relative Risk Ranking: (√) Low ( ) Moderate ( ) High ( ) Undetermined

Control or Protective Measures (see also Table 3):

(√) Tailgate Meetings	(√) PPE, Level D	(√) Air Monitoring (periodic)
(√) Operator Training	(√) Site Control	( ) Decontamination

(√) Engineering Controls: Utility survey prior to intrusive activities. Erect suitable barriers around operations to prevent unauthorized pedestrian and vehicular traffic.

(√) SOPs: Heat Stress Prevention (HSP-3); Hearing Conservation (HSP-5).

(√) Other: Maintain supply of cool fluids, sunscreen, and insect repellent onsite. Erect suitable barriers around operations to restrict unauthorized pedestrian and vehicular traffic.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by OHSC. Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

LEVEL OF PROTECTION:	( ) A ( ) B	( ) C (√) D	( ) Modified D
RESPIRATOR: (Level C and above)	( ) SCBA, Airline ( ) OV/AG Cart.	( ) Purif. Resp. ( ) Other Cart. ____	( ) Escape Mask
PROTECTIVE CLOTHING:	( ) Encap. Suit ( ) Saranex	( ) Tyvek ( ) Splash Suit	( ) PE Tyvek ( ) Other ____
HEAD/EYE/EAR:	( ) Hard Hat ( ) Splash Shield	(√) Safety Glasses (√) Ear Plugs/Muffs	( ) Goggles ( ) Other ____
GLOVES: (outer) (inner)	(√) Nitrile (√) N-Ex Nitrile	( ) Neoprene ( ) Vinyl	( ) PVC ( ) Other ____
FOOTWEAR:	(√) Steel-toed Leather ( ) Steel-toed Rubber	( ) Overboots ( ) Other ____	

Modifications Permitted: Steel-toed rubber boots may be substituted for steel-toed leather boots.

Task Name: 24 Soil Borings Using Hollow Stem Auger Drilling Methods and Split-spoon Sample Collection (3 @100', 21 @50' bgs)

Potential Hazards: (Check all that apply to either existing conditions or that result site operations)

(√) Rotating Machinery	( ) Projectiles	( ) Confined Space
(√) Heat Stress	(√) Physical Exertion	(√) Biological (insects)
( ) Cold Stress	(√) Noise (>85 dBA)	(√) Electrical (utilities)
(√) Heavy Equipment	(√) Vehicle Traffic	(√) Chemical Exposure
(√) Intrusive Activ's (underline)	( ) Fire/Explosion (underline)	(√) Other (List)
* Drilling	* Flam. Materials	Slips, trips, and falls;
• Soil Vapor Surv.	• Low-lying Areas	Back stress
* Sampling	• Fuel lines	

Relative Risk Ranking: ( ) Low ( ) High (√) Moderate ( ) Undetermined

Control or Protective Measures: (Refer also to Table 3)

(√) Tailgate Meetings	(√) PPE, Level C	(√) Air Monitoring (see Table 5)
(√) Operator Training	(√) Site Control	(√) Decontamination

(√) Engineering Controls: Utility survey prior to drilling, dust suppression (fences, tarping & water spray), locate overhead lines prior to moving rig.

(√) SOPs: Heat Stress Prevention (HSP-3); Decontamination (HSP-6), Drilling Safety (HSP-7), Hearing Conserv. (HSP-5), Drilling and Heavy Equipment Operation Safety Guidelines (Appendix 4), Respirat. Prot. (HSP-4).

(√) Other: Erect suitable barriers around operations and property line. Maintain supply of cool fluids, insect repellent, and sunscreen onsite.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task, based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data and Action Levels (Table 5) and site conditions, as determined by the OHSC. Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

LEVEL OF PROTECTION:	( ) A	(√) C	( ) Modified D
	( ) B	( ) D	
RESPIRATOR:	( ) SCBA, Airline	(√) Purif. Resp.	( ) Escape Mask
(Level C and above)	(√) OV/AG Cart.	(√) Other : Dust prefilters & pads	
PROTECTIVE CLOTHING:	( ) Encap. Suit	(√) Tyvek	( ) PE Tyvek
	( ) Saranex	( ) Splash Suit	( ) Other ____
HEAD/EYE/EAR:	(√) Hard Hat	(√) Safety Glasses	( ) Goggles
	( ) Splash Shield	(√) Ear Plugs/Muffs	( ) Other____
GLOVES: (outer)	(√) Nitrile	( ) Neoprene	( ) PVC
(inner)	(√) N-Ex Nitrile	( ) Vinyl	( ) Other ____
FOOTWEAR	(√) Steel-toed Leather	(√) Overboots	
	( ) Steel-toed Rubber	( ) Other ____	

Modifications Permitted: Steel-toed rubber boots may be substituted for steel-toed leather and overboots.

Task Name: Trenching (4-6 ft bgs) and Soil Sampling at 6 Unpaved Locations Using a Backhoe

Potential Hazards: (Check all that apply to either existing conditions or that result site operations)

( ) Rotating Machinery	( ) Projectiles	(†) Confined Space
(√) Heat Stress	(√) Physical Exertion	(√) Biological (insects)
( ) Cold Stress	(√) Noise (>85 dBA)	(√) Electrical (utilities)
(√) Heavy Equipment	(√) Vehicle Traffic	(√) Chemical Exposure
(√) Intrusive Activ's	(√) Fire/Explosion	(√) Other (List)
* Sampling	* Flam. Materials	Slips, trips, and falls;
* Trenching	• Fuel lines	Open trenches

Relative Risk Ranking:

( ) Low	( ) High
(√) Moderate	( ) Undetermined

Control or Protective Measures: (see also Table 3)

(√) Tailgate Meetings	(√) PPE, Level C	(√) Air Monitoring (see Table 5)
(√) Operator Training	(√) Site Control	(√) Decontamination

(√) Engineering Controls: Utility survey; cover excavated soil; use dust suppression as needed; secure and ground the backhoe prior to digging, locate exact line location by hand.

(√) SOPs: Heat Stress Prevention; (HSP-3) Hearing Conservation (HSP-5); Resp. Prot. (HSP-4), Decon. (HSP-6); †Confined Space Entry (HSP-2); Trenching & Excavation Guidelines (Append.5),

(√) Other: Avoid trench entry. If required, trenches will be shored 1-1/2:1 (H:V) and CSE protocol including permit procedures will be followed. Flag and barricade open trenches while present, unattended trenches should be backfilled or be covered with steel traffic plates. Maintain supply of cool fluids, sunscreen, and insect repellent.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the OHSC. Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

LEVEL OF PROTECTION:	( ) A	(√) C	( ) Modified D
	(†) B	( ) D	
RESPIRATOR:	(†) SCBA, Airline	(√) Purif. Resp.	( ) Escape Mask
(Level C and above)	(√) OV/AG Cart.	(√) Other: Dust prefilters & pads	
PROTECTIVE CLOTHING:	( ) Encap. Suit	(√) Tyvek	( ) PE Tyvek
	( ) Saranex	( ) Splash Suit	( ) Other ____
HEAD/EYE/EAR:	(√) Hard Hat	(√) Safety Glasses	( ) Goggles
	( ) Splash Shield	(√) Ear Plugs/Muffs	( ) Other____
GLOVES: (outer)	(√) Nitrile	( ) Neoprene	( ) PVC
(inner)	(√) N-Ex Nitrile	( ) Vinyl	(*) Other Rubber
FOOTWEAR:	(√) Steel-toed Leather	(√) Overboots	
	( ) Steel-toed Rubber	( ) Other____	

Modifications Permitted: Steel-toed rubber boots may be substituted for steel-toed leather and overboots. †Potential upgrade to Level B with trench entry. *Use rubber insulated protective gloves if locating exact location of underground lines with hand tools.

Task Name: Sampling Equipment Decontamination

Potential Hazards: (Check all that apply to either existing conditions or that result from site operations)

( ) Rotating Machinery	( ) Projectiles	( ) Confined Space
(√) Heat Stress	(√) Physical Exertion	(√) Biological (insects)
( ) Cold Stress	(*) Noise (>85 dBA) (steam cln)	( ) Electrical (utilities)
( ) Heavy Equipment	(√) Vehicle Traffic	(√) Chemical Exposure
( ) Intrusive Activ's (underline)	(√) Fire/Explosion (underline)	(√) Other (List)
• Drilling	* Flam. Materials	Slips, trips, and falls;
• Sampling	• Fuel lines	Back stress; Steam burns

Relative Risk Ranking:	(√) Low	( ) High
	(*) Moderate (steam clean.)	( ) Undetermined

Control or Protective Measures:

(√) Tailgate Meetings	(√) PPE, Level Mod. D	(†) Air Monitoring (periodic for IPA)
(*) Operator Training (steam. cln)	(√) Site Control	(√) Decontamination

(√) Engineering Controls: Elevate decon containers to reduce back stress. Contain splash and overspray from steam cleaning operations; point steam cleaner away from self and nearby personnel; limit use to working hours.

(√) SOPs: Heat Stress Prevention (HSP-3), Decontamination (HSP-6), Hearing Conservation (HSP-5), SAP.

(√) Other: Maintain supply of insect repellent, sunscreen, and cool fluids onsite; stand upwind while applying solvent rinse during equipment decon; rotate task among personnel to reduce heat stress potential.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the onsite health and safety coordinator (OHSC). Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

LEVEL OF PROTECTION:	( ) A	(†) C	(√) Modified D
	( ) B	( ) D	
RESPIRATOR:	( ) SCBA, Airline	(*) Purif. Resp.	( ) Escape Mask
(Level C and above)	(†) OV/AG Cart.	( ) Other Cart. ____	
PROTECTIVE CLOTHING:	( ) Encap. Suit	(√) Tyvek	( ) PE Tyvek
	( ) Saranex	(*) Splash Suit	( ) Other ____
HEAD/EYE/EAR:	(√) Hard Hat	(√) Safety Glasses	(*) Goggles
	(*) Splash Shield	(*) Ear Plugs/Muffs	( ) Other ____
GLOVES: (outer)	(√) Nitrile	( ) Neoprene	( ) PVC
(inner)	(√) N-Ex Nitrile	( ) Vinyl	( ) Other ____
FOOTWEAR:	( ) Steel-toed Leather	( ) Overboots	
	(√) Steel-toed Rubber	( ) Other ____	

Modifications Permitted: Steel-toed leather boots w/ chemical overboots may be substituted. If IPA vapors reach 20 ppm, donn goggles; Care should be taken to avoid splashing of decon solutions; use goggles, splash and hearing protection during operation of steam cleaner.

Task Name: Management of Investigation-Derived Waste (IDW)

Potential Hazards: (Check all that apply to either existing conditions or that result from site operations)

( ) Rotating Machinery	( ) Projectiles	( ) Confined Space
(√) Heat Stress	(√) Physical Exertion	( ) Biological (insects)
( ) Cold Stress	(*) Noise (>85 dBA)(forklift)	( ) Electrical (utilities)
(√) Heavy Equipment	(√) Vehicle Traffic	(√) Chemical Exposure
(√) Intrusive Activ's (underline)	(√) Fire/Explosion (underline)	(√) Other (List)
• Drilling	* Flam. Materials	Slips, trips, and falls;
* Waste Management	• Low-lying Areas	Back stress.
* Drum Handling	• Fuel lines	
• Sampling		

Relative Risk Ranking: (√) Low ( ) Moderate ( ) High ( ) Undetermined

Control or Protective Measures: (see also Table 3)

(√) Tailgate Meetings	(√) PPE, Level Mod. D	(√) Air Monitoring (Periodic)
(√) Operator Training	(√) Site Control	(√) Decontamination

(√) Engineering Controls: Drummed IDW will be labeled, protected & stored at the upper fenced location

(√) SOPs: Heat Stress Prevention(HSP-3), Decontamination(HSP-6), Hearing Conservation(HSP-5),

(√) Other: Maintain supply of cool fluids, sunscreen, and insect repellent onsite; use reflective vests w/ traffic; use drum dolly or other mechanical means to transport loads >50 lbs

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the onsite health and safety coordinator (OHSC). Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

LEVEL OF PROTECTION:	( ) A	( ) C	(√) Modified D
	( ) B	( ) D	
RESPIRATOR:	( ) SCBA, Airline	( ) Purif. Resp.	( ) Escape Mask
(Level C and above)	( ) OV/AG Cart.	( ) Other Cart. ____	
PROTECTIVE CLOTHING:	( ) Encap. Suit	(√) Tyvek	( ) PE Tyvek
	( ) Saranex	( ) Splash Suit	( ) Other ____
HEAD/EYE/EAR:	(√) Hard Hat	(√) Safety Glasses	( ) Goggles
	( ) Splash Shield	(√) Ear Plugs/Muffs	( ) Other ____
GLOVES: (outer)	(√) Nitrile	( ) Neoprene	( ) PVC
(inner)	(√) N-Ex Nitrile	( ) Vinyl	( ) Other ____
FOOTWEAR:	(√) Steel-toed Leather	(√) Overboots	
	( ) Steel-toed Rubber	( ) Other ____	

Modifications Permitted: Steel-toed rubber boots may be substituted for steel-toed leather and overboots

Task Name: Land Survey of Sampling Locations

Potential Hazards: (Check all that apply to either existing conditions or that result site operations)

( ) Rotating Machinery	( ) Projectiles	( ) Confined Space
(√) Heat Stress	(√) Physical Exertion	(√) Biological (insects)
( ) Cold Stress	( ) Noise (>85 dBA)	( ) Electrical (utilities)
( ) Heavy Equipment	(√) Vehicle Traffic	( ) Chemical Exposure
( ) Intrusive Activ's (underline)	( ) Fire/Explosion (underline)	(√) Other (List)
• Drilling	• Flam. Materials	Slips, trips, and falls.
• Soil Vapor Surv.	• Low-lying Areas	________
• Cone Penetrom. Surv.	• Fuel lines	________
• Sampling		

Relative Risk Ranking: (√) Low ( ) Moderate ( ) High ( ) Undetermined

Control or Protective Measures:

(√) Tailgate Meetings	( ) PPE, Level D	( ) Air Monitoring
( ) Operator Training	( ) Site Control	( ) Decontamination

( ) Engineering Controls: ________

(√) SOPs: Heat Stress Prevention (HSP-3).

(√) Other: Maintain supply of cool fluids, sunscreen, and insect repellent onsite. Stay clear of visibly contaminated areas. Use of reflective traffic vest.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the onsite health and safety coordinator (OHSC). Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

LEVEL OF PROTECTION:	( ) A ( ) B	( ) C (√) D	( ) Modified D
RESPIRATOR: (Level C and above)	( ) SCBA, Airline ( ) OV/AG Cart.	( ) Purif. Resp. ( ) Other Cart. ________	( ) Escape Mask
PROTECTIVE CLOTHING:	( ) Encap. Suit ( ) Saranex	( ) Tyvek ( ) Splash Suit	( ) PE Tyvek ( ) Other ____
HEAD/EYE/EAR:	( ) Hard Hat ( ) Splash Shield	(√) Safety Glasses ( ) Ear Plugs/Muffs	( ) Goggles ( ) Other____
GLOVES: (outer) (inner)	( ) Nitrile ( ) Latex	( ) Neoprene ( ) Vinyl	( ) PVC ( ) Other ________
FOOTWEAR:	(√) Steel-toed Leather ( ) Steel-toed Rubber	( ) Overboots ( ) Other________	

Modifications Permitted: Steel-toed rubber boots may be substituted for steel-toed leather boots.

PERSONNEL PROTECTION

The prescribed methods and procedures used to protect personnel (site workers and adjacent community) from overexposure to hazardous materials and hazardous conditions posed by site operations are grouped into three primary categories: Administrative Controls, Engineering Controls, and Personal Protective Equipment (PPE).

ADMINISTRATIVE CONTROLS

TRAINING

Comprehensive: All routine onsite workers performing intrusive activities will have completed the OSHA 40-hour Hazardous Waste Operations Training, 24-hour onsite supervised training and appropriate annual updates. Supervisors will have completed an additional 8-hrs of OSHA Supervisory Training. All Ogden staff will have completed training in First Aid/CPR and fire extinguisher usage.

Occasional site workers that will not receive exposures exceeding permissible exposure limit (i.e., geophysical and land surveyors) require only 24 hours of OSHA Hazardous Waste Operations Training and one day of onsite training and supervision.

Specialized: Prior to the initiation of site activities, the OHSC and FM will conduct a H&S "kick-off" orientation. At this time, pertinent Ogden SOPs and the site-specific Health and Safety Plan (HSP) will be discussed in detail with special attention being given to site chemical and physical hazards, PPE, emergency procedures, etc. Upon completion of this briefing, all routine field personnel, including subcontractors, will be required to read and sign the acceptance sheet of this HSP. Site visitors and non-routine subcontractors that do not attend this meeting will be required to undergo a specialized health and safety orientation, as documented in Appendix 2.

Daily: "Tailgate" Safety meetings will be conducted each morning by the OHSC or FM for all phases of work. Topics of discussion will include: work tasks and designated PPE, emergency procedures, evacuation routes, instruction in use of safety equipment (as required), prior safety problems, recognition of signs and symptoms of overexposure, importance of proper decontamination and personal hygiene, etc. These meetings must be documented; forms are provided in Appendix 2.

MEDICAL SURVEILLANCE

Periodic Comprehensive Exam: All personnel requiring access to controlled work areas will have completed a pre-assignment medical examination and a periodic (usually annual) update examination prior to assignment, in accordance with OSHA 29 CFR 1910.120(f). The exam must be performed by an Occupational Health Physician, who will provide a written clearance for hazardous waste site work and for respirator usage. Exam protocols must be at least as stringent as those defined in the Ogden Medical Surveillance Program (Appendix I to the HSMP).

Emergency Medical Treatment: Personnel who exhibit signs and symptoms of chemical or heat overexposure, or have been injured on the job, might also seek medical services. See also the Emergency Response section for specific information regarding emergency services and required report submittals. Subcontractors should provide internal Workers' Compensation information to the OHSC or HSM during the pre-work meeting.

Special: Field personnel should have current (within 10 years) Tetanus shots.

SUBMITTAL OF CERTIFICATIONS

A health and safety certification letter must be submitted to ANGRC by the HSM prior to the mobilization of field crews; intended personnel is taken directly from the Site Visit Form. The OHSC will maintain onsite a copy of this letter (and all subsequent revisions for personnel additions and substitutions) certifying that all Ogden and subcontracted personnel have satisfied the minimum training and medical requirements listed above. Supporting documentation and certificates will remain on file with the HSM and the Purchasing Department (subcontractors only). This certification letter will not be prepared in the absence of adequate documentation.

Table 4
INITIAL* ASSIGNMENTS OF PROTECTION LEVELS, TRAINING, AND MEDICAL SURVEILLANCE OR SITE WORK TASKS

	Level of	HAZWOPER Training		
Task Name	**Protection**	**40-Hr**	**24-Hr**	**Med. Surv.**
Land Survey (Phase I)	D		X	Yes
Geophysical Survey	D		X	Yes
Soil Gas Survey	D	X		Yes
Soil Borings	C	X		Yes
Trenching	C	X		Yes
Equipment Decon	Mod. D**	X		Yes
Management of IDW	Mod. D**	X		Yes
Land Survey (Phase II)	D		X	
Yes				

* Initial assignments may be modified by the OHSC as additional data are received from monitoring data and compared to action levels (Table 5), or as warranted by site conditions. Any changes will be noted in this HSP and documented on ROCs (Appendix 2).

** Modified D PPE indicates the use of protective clothing but no respiratory protection.

SAFE WORK PRACTICES:

1) Unauthorized personnel are not allowed onsite, particularly in the EZ.
2) Work groups will always consist of at least two (2) team members.
3) Wind-flags will be positioned onsite so that work can be performed upwind as much as possible.
4) A high standard of personal hygiene will be observed. Smoking, eating, drinking, chewing gum or tobacco, taking medication, and applying cosmetics will not be permitted within any restricted or exclusion zone.
5) Wearing of contact lenses is prohibited.
6) Open flames are not allowed anywhere onsite without a hot-work permit.
7) Personnel under the obvious influence of alcohol or controlled substances are not allowed onsite; those taking medications must notify the OHSC.
8) Personnel will avoid skin contact with contaminated or potentially-contaminated media. If such contact occurs, the affected areas should be washed thoroughly with soap and water.
9) Personnel will discard and replace any damaged or heavily soiled protective clothing. Discarded PPE will be drummed at the end of each day.
10) Personnel should notify the OHSC of any defective monitoring, emergency, or other protective/safety equipment.
11) A supply of potable water, electrolyte replacement solutions, shaded break area, and sufficient lighting will be maintained onsite; sanitary facilities will be accessible to personnel.
12) Owners/operators of heavy equipment will ensure that they are in good working order by performing daily inspections and routine maintenance. Deficiencies affecting health and safety shall be corrected prior to equipment use.
13) All unsafe conditions shall be made safe immediately. All unsafe conditions not in the scope of the project shall be reported to the PM and the condition corrected.
14) All site personnel will familiarize themselves with these and the emergency procedures during daily tailgate, pre-work, safety meetings.

SANITATION AND ILLUMINATION

Potable drinking water in tightly closed containers shall be supplied and clearly marked for its intended use. Restrooms and a field washing area with potable water will be available onsite for use. Since the nature of this project is mobile and of a duration less than six months, no permanent shower/change facility will be provided.

It is anticipated that all site work will be conducted during daylight hours. If circumstances arise in which field work is to be conducted before or after daylight, or sunlight is obstructed, illumination within all general site areas will be maintained at or above 5 foot-candles.

RECORDKEEPING

The health and safety field binder/files maintained by the OHSC, or his/her designee, will be the primary form of record keeping and documentation of site activities. These documents, primarily the forms provided in Appendix 2, will be completed in sufficient detail to document the work performed; any unusual or significant circumstances under which the work was performed; any unanticipated/ unplanned action taken to mitigate or to otherwise cope with unexpected field conditions; and pertinent comments about site-specific conditions that could have a bearing on the work performed. Documentation is required for all phases of work. See also the OHSC duties listed under Personnel Responsibilities. Recordkeeping practices will follow 29 CFR 1910.

ENGINEERING CONTROLS

Barricades: barricades, traffic cones, and/or marking/caution tape will be erected at a safe distance from excavations, pits, hazardous areas and moving equipment in order to prevent unauthorized access to work areas from vehicular and pedestrian traffic. Barriers will be appropriate for the level of work activities and anticipated traffic. Signs will be conspicuously posted as: "CONSTRUCTION AREA - Authorized Personnel Only", or equivalent.

Fences: Nylon-mesh (or equivalent) field screens will be constructed between (____________ ____________), primarily to reduce offsite migration of fugitive dusts and to limit visibility.

Dust Suppression: dust suppression techniques will be employed to minimize the generation of dust/particulates and associated contaminates into the atmospheres, to the greatest extent possible. The water tap should be fitted with a nozzle or other device to create a water spray or curtain to contain dusts; foam may not be used on this project. Also, stationary sources of dusts, e.g., stockpiles, should be covered with a plastic (visqueen) or canvas tarping. Trenching operations have the largest dust-generating potential, modification (reduction) of work pace may be necessary to reduce visible emissions; dust screens shall be moved as needed. Monitoring of the work areas and the fencelines shall be conducted on a regular, frequent basis with the portable PM_{10} dust monitor to ensure engineering controls are effectively reducing concentrations below action levels.

Rinseate Collection/Containment: A system for collection of rinseate from decontamination operations (heavy equipment, sampling equipment and personnel decon) will be required. The system will be as complex or simple as necessary to collect and contain spent decon fluids, including overspray from steam cleaning operations. Construction of the "permanent" heavy equipment decon area and all areas where steam cleaning of sampling equipment (augers, spoons, etc.) will be the responsibility of the equipment contractor. Construction of the temporary stations for personnel and other sampling equipment will be the responsibility of the OHSC and FM. Decon buckets should be placed in larger, plastic bins to contain splash. All spent fluids will be containerized in accordance with procedures/guidelines referenced in this HSP (see Decon).

Noise Reduction: Site activities in proximity to construction and heavy equipment often exposes workers to excessive noise. It is anticipated that situations may arise when noise levels may exceed 85 decibels (dBA) in an eight hour time-weighted average (TWA). An example of this possibility is working in close proximity to the subcontractor during drilling or trenching activities onsite. If excessive noise levels occur, efforts will be made to control this by issuance of ear plugs to all personnel and by implementing a system of hand signals understood by all.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection for this site have been specified as Levels D, Modified D, C and potentially B. Level B will be used if trench entry (confined space) is required and there is a potential for IDLH conditions (see Action Levels). All personnel entering controlled work zones will initially be required to wear the Level of Protection as specified in the Task Hazard Analyses section and summarized in Table 4. Protection may be upgraded or downgraded depending on monitoring data (compared with action levels) and site conditions, as determined by the OHSC. All changes must be noted in this HSP and be documented on ROCs (Appendix 2). The following outlines the minimum requirements for each level of protection which is assigned or potentially assigned.

Level D PPE:

- Work shirt and full-length cotton pants or coveralls
- ANSI standard steel toed work boots
- ANSI standard hard hat (when working around heavy equipment or overhead "bump" hazards)
- ANSI standard safety glasses
- ANSI standard hearing protectors (when working in high noise areas, e.g., steam cleaners & heavy equipment)

Modified Level D PPE:

- Level D equipment
- Tyvek suits, blue as practical (upgrade to PE or Saranex-coated Tyvek as needed)
- Outer chemical-resistant gloves and inner nitrile or vinyl gloves
- Boot covers or chemical-resistant boots

Level C PPE:

- Level Mod. D equipment, with taping of suits to boots and gloves as necessary
- NIOSH approved half-face or full-face air purifying respirator with organic vapor/acid gas cartridges and particulate pre-filters (respirator usage clearance is defined in the Respiratory Protection SOP HSP-4, HSMP).

Level B PPE:

- Level Mod. D equipment, use of chemical-resistant suits, taped to boots and gloves
- NIOSH approved pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape-SCBA (additional employee training is required for Level B operations).

PPE Donning/Doffing Procedure: The following procedures are given as a guide; failure to adhere to these procedures may result in the PPE being ineffective against contaminants. These may be altered by the OHSC if improvements can be made to the procedure and these changes are warranted in the field. Also, some articles of PPE may not be necessary for all site tasks.

PPE Donning Procedure: (for Mod. Level D and greater)

- Inspect all protective gear before donning.
- Donn Tyvek suit, inner gloves and outer gloves, secure w/ tape (leave pull tab). If Tyvek is loose secure w/ tape to avoid capture in moving or rotating equipment.
- Donn respirator. If not in Level C, maintain respirator in a sealed plastic bag onsite in case of an upgrade.

PPE Doffing Procedure:

- Wash/rinse (if necessary) excess mud or other debris from outer boots, gloves, and clothing.
- Remove tape using pull tab and remove outer clothing in the order of: boots, outer gloves, and tyvek suits. Place disposable and reusable PPE in designated (separate) containers for donning during reentry.
- Remove respirator (if applicable).
- Remove inner gloves.
- Enter the clean zone.

SITE CONTROL

SITE SECURITY:

Personnel and vehicle badges/passes will be arranged by the ANGRC PM and Program Manager. Access will be limited to all controlled areas via the prescribed administrative (certifications) and engineering (barricades) controls. All site staff and visitors will note arrival and departure times on the Employee/Visitor Roster. All equipment, tools and property shall be secured at the end of the day.

VISITOR ACCESS:

All site visitors (except OSHA) must receive prior approval from the FM and the ANGRC PM, and may do so only for the purposes of observing site conditions or operations. Upon arrival, visitors will report to the OHSC where he/she will receive and sign the Visitor H&S Orientation Form. Visitors will not be allowed into controlled work areas unless training and medical requirements have been met and documented. All media inquiries will be directed to (   ).

WORK ZONES: (See Figure 3 for suggested zone demarcations, use site map as the base map)

Support/Clean Zone (SZ/CZ): The SZ/CZ will be upwind and away from the contaminated area. Vehicles, emergency equipment, the telephone and break area, as well as the Notetaker and any non-essential personnel will be maintained in this area.

Contamination Reduction Zone (CRZ): Two separate decontamination lines shall be established for personnel and sampling equipment in the CRZ. The CRZ should be marked as narrow corridors through which personnel and equipment pass from the EZ to the SZ/CZ.

Transition Zone (TZ): The TZ will be established upwind of the hot area and serve as support for sample QA/QC and packing. Coolers in this zone will be protected from contamination using polyethylene sheeting and decontaminated prior to leaving the site.

Exclusion Zone (EZ): The EZ is defined as ~ 30 foot radius around intrusive activities. Access should be restricted to field sampling crews and necessary equipment operators.

OTHER:

The FM and the ANGRC PM will schedule and coordinate site activities so that Air National Guard activities, as well as Ogden activities, are minimally impacted. Work areas will have restricted access to pedestrian and vehicular traffic. Barriers to access should be consistent with the level of restriction necessary (i.e., tape, cones, barricades) as appropriate for the work location. The ANGRC PM will designate parking locations for vehicles, equipment and supplies; these should be marked.

COMMUNICATIONS:

The "buddy system" will be enforced for field activities involving potential exposure to hazardous or toxic materials, and during any work within the exclusion zone. Each person will observe their buddy for symptoms of chemical or heat overexposure and provide first aid or emergency assistance when warranted. A mobile phone will be maintained onsite for emergency use.

The following emergency hand signals will be used:

• Thumbs up	=	OK; understand
• Thumbs down	=	No; negative
• Grasping buddy's wrist	=	Leave site now
• Hands on top of head	=	Need assistance
• Horn - one long blast	=	Evacuate site
• Horn - two short blasts	=	All clear, return to site

AIR SURVEILLANCE

EXPOSURE MONITORING:

Type	Minimum Recommended Frequency
Background:	Once per day in the work area and perimeter using direct-reading instruments, prior to any intrusive activities or equipment start-up.
Perimeter:	Once per hour using direct-reading instruments during intrusive activities.
Personnel:	At least twice per day in the breathing zone of those with the highest anticipated exposure during intrusive activities. More frequent monitoring may be recommended in specific HSP.
Area:	At least twice per day in each work zone and at the onset of any new intrusive activities, or at new locations. More frequent monitoring may be recommended in specific HSP.
Environmental:	Periodic field screening of selected samples as per the SAP.

EQUIPMENT: The OHSC will maintain equipment SOPs (Appendix L-11 - L-12, HSMP) onsite that specify calibration, general use, and troubleshooting procedures. All monitoring equipment will be field calibrated on a daily basis according to the manufacturers instructions, and will be recorded on the calibration log (Appendix 2).

Equipment	Contaminant	Work Activity
Thermo PID, or equiv.	Ionizable hydrocarbons	All intrusive active. & Ground water samp.
MiniRam Dust Monitor	Nuisance & Potent. Contaminated Dusts	Trench. & Excav.
Explosimeter (LEL/O2)	Explosive gases & Oxygen Levels	Drilling, Trenching and welding/cutting
Calorimetric Tubes	VC, PCE, TCE	Drilling, Trenching
3M Org. Vapr. Dosimeter Badges	Selected VOCs	Drilling, Trenching @ Fenceline
Personal Sampling Pump*	Selected VOCs	Trenching, highest exposure potential

LABORATORY ANALYSES: The selection of parameters and sampling methods and analyses will be performed by a competent hygienist. NIOSH or OSHA methods should be used to document personnel exposure.

Parameter	Sampling Media	Analytical Method
TBD	TBD	TBD

ACTION LEVELS: Action levels should be established for upgrading/downgrading PPE, work stoppages, and evacuation (see App. 3). Action levels for upgrade/downgrade of respirator are sustained readings above background in the breathing zone of site personnel. Record readings on Air Surveillance Record forms in Appendix 2.

Table 5

ACTION LEVELS

Equipment	Action Level	Action to be Taken
PID (OVM) ppm/v equiv. units	<5 units for 5 minutes in BZ	Check Colorimetric Tubes for (type of comp.); if below action level, Downgrade to Level Mod. D
	≥25 units for 5 minutes in BZ	Maintain Level C (OV/AG)
	>50 units for 5 minutes in BZ	Evacuate or upgrade to Level B
	>5 units for 5 minutes at P	Cease work until levels drop
MiniRAM PM_{10}	<2 units for 5 minutes in BZ	Downgrade to Level Mod. D
mg/m3 equiv. units	≥2 units for 5 minutes in BZ	Maintain Level C (OV/AG) with pre-filters, suppress dusts
	>5 units for 5 minutes in BZ	Cease operations, suppress dusts
	>0.5 units for 5 minutes at P	Cease operations, suppress dusts
Explosimeter/O2	>10% LEL	Standby, evaluate conditions
(% Explosive gases in air by volume)	>25% LEL	Cease operations and evacuate for 15 minutes, notify HSM
	<19.5% O2	Upgrade to Level B
	>23.5% O2	Cease operations and evacuate for 15 minutes, notify HSM
Colorimetric Tubes		
(comp.)	any detection	Upgrade to Level C (OV/AG)
	> 10 ppm	Upgrade to Level B , call HSM
(comp.)	> 10 ppm	Upgrade to Level C (OV/AG)
	>100 ppm	Upgrade to Level B, call HSM
3M Badges & air samples µg/g by lab	NA	None

DECONTAMINATION PROCEDURES (Procedures for the decontamination of sampling tools and other related equipment are specified in the SAP. Note that separate areas should be established for personnel, sampling and heavy equipment decontamination, see also Engineering Controls and SOP HSP-6).

PERSONNEL DECONTAMINATION:

Equipment: long-handled soft-bristled brushes, galvanized wash tubs or equivalent, pump-activated sprayer, garbage cans with plastic liners and drums with liners, visqueen, paper towels and duct tape.

Decon Solution: Alconox (biodegradable lab-grade detergent); tap water for rinsing.

Procedures: Two stages of decon have been designated:
1) **Intermediate**: for periodic exits out of the exclusion zone during sample transport and management, or for short breaks.
Steps: Outer boot and glove wash with Alconox solution, outer boot and glove rinse, removal of outer glove and storage for later use, entering transition zone for sample management, return to exclusion zone wearing new or cleaned outer gloves.

2) **Final**: for use prior to taking cool down breaks, lunch and exiting the site.
Steps: Segregated equipment drop (for instruments and equipment requiring special decon as outlined in the SAP), outer boot and glove wash with Alconox solution, outer boot and glove rinse, removal or disposal of outer boots, removal and disposal (if not cleaned to "like new" condition) of outer gloves, removal and disposal of coverall, removal and disposal of inner gloves in designated receptacles, and general field wash for personal hygiene.

EQUIPMENT DECONTAMINATION:

All equipment that will potentially contact samples will be decontaminated prior to, and following,sampling events; as per procedures specified in the SAP. Heavy equipment in direct contact with soil and/or groundwater, such as the drill rig augers and backhoe buckets, shall be steam cleaned onsite and be inspected by the FM prior to leaving the site. The permanent decon area (for steam cleaning) will be located at the (________________), and will be constructed by the equipment subcontractor (see also Engineering Controls). Temporary decon stations (bucket wash) will be located near work areas, and will be positioned up- or cross-wind of operations.

DISPOSAL PROCEDURES:

All discarded materials that accumulate from onsite activities (PPE, decon fluids, supplies, etc.)will be segregated by matrix and by source location; placed in labeled, DOT-approved, 55-gallon drums; and be stored in a secure, designated location at the (________________) (________). Analytical results will be evaluated prior to disposal. All IDW will be handled, labeled, stored, inventoried and disposed of in accordance with the IDW SOP.

EMERGENCY DECONTAMINATION:

For first-aid of non life-threatening injuries, evacuate to decontamination line and decontaminate as much as possible or practical; contaminated clothing should be removed. For life-threatening injuries/exposures, field decontaminate as much as possible for his/her own safety, wrap in a blanket or polyethylene sheeting, and immediately transport to the designated medical facility. Also, phone ahead and bring this HSP for MSDS access by medical staff (see Emergency Response).

EMERGENCY RESPONSE

PRE-PLANNING AND GENERAL PROCEDURES:

General: Site personnel should be constantly alert to recognize potentially unsafe work practices, hazardous work environments, and IDLH conditions; and should be routinely reminded of signs and symptoms of chemical and heat over exposure. Emergency response procedures (this section) should be reviewed daily.

In the event of a large-scale spill, fire/explosion, or major emergency, the FM is expected to notify the ANGRC PM, evacuate the area; and let appropriately trained emergency staff respond to the situation. The safety and well-being of site personnel, visitors and the adjacent community will be of utmost importance in determining the appropriate response to a given emergency. An Employee Emergency and Fire Prevention Plan has been prepared in accordance with OSHA 29 CFR 1910.38; annual training is required for all Ogden personnel.

Emergency Coordinator (EC): Both the FM and OHSC will serve jointly as ECs during an actual emergency response situation. The FM will serve as the primary EC at all times; first-aid and rescue duties are shared between the first-aid/CPR trained team members (3-4 people). All foreseeable first-aid and rescue equipment should be stored onsite in an accessible area.

Site Maps: An updated site map (see Site Control) that is used during daily tailgate meetings will be used to inform the staff of hazardous areas, zone boundaries, site terrain, evacuation routes, work crew locations, and any site changes. In the unlikely event that an emergency occurs, the problem areas will be pinpointed on the site map, and pertinent information, such as weather and wind direction, temperature, and forecast, will be added as obtained. This map will be provided to the responding agencies.

Safe Refuge Area: TBD and discussed in the tailgate meetings by the ECs daily, once onsite. It will be set up in the Support Zone or at an offsite location in the event of a site-wide evacuation. This area will be upwind and the location and escape routes will be designated on site control

maps. It will contain emergency equipment, escape route maps, communications and the Emergency Reference (call) List. This is required for all phases of work.

Site Security and Control: In an emergency, the primary EC (FM) will take a "headcount" against the Employee/Visitor Daily Roster (Appendix 2); search/account for missing persons; notify the emergency crews (as applicable); and limit access into the hazardous emergency area to necessary rescue and response personnel in order to prevent additional injury and possible exposures.

Evacuation Procedures: Expeditious evacuation routes to the safe refuge area(s) will be established daily for all work area locations, with respect to the wind direction. Evacuation notification will be a **continuous blast on a canned siren, vehicle horn, or direct verbal communication.** Emergency drills should be performed periodically; update plan.

In the unlikely event that an evacuation is necessary, all personnel will immediately proceed to the pre-determined safe refuge area, decontaminating to the extent possible for personal safety, based on the emergency. The EC should then begin the Site Security and Control Measures.

SITE-SPECIFIC RESPONSE SCENARIOS:

Natural Disasters

Tsunamis
Alarm: Steady tone siren
Action: Immediately tune in radio or t.v. (no telephone usage) for Civil Defense (CD) bulletin.
Alarm: Wailing
Action: Imminent threat, mandates an evacuation out of the "danger" zone as indicated by CD bulletins. Site is not located in the Tsunami Evacuation Zone. If in a safe area, remain there until "all clear" signal is broadcasted over the radio (no siren).

Hurricanes
"Watch" condition indicates a 36-hour notification of approaching storm. "Warning" condition indicates 24-hour notification of approaching storm and mandates an evacuation out of the "danger" zone as indicated by CD bulletins.
Action: Notify all personnel; refer to Action Plan; secure site, equipment /tools, and IDW areas; remove and copy irreplaceable documents; disconnect power sources; evacuate to safe shelter or Hotel. Personnel are allowed to continue work on the site only to the extent of preparing for the storm, and only if favorable weather conditions exist.

Weather Related Emergencies
All work will cease should any of the following weather conditions arise:

- Poor visibility
- Precipitation severe enough to impair safe movement/travel

- Lightning in the immediate area
- Winds in excess of 40 miles per hour
- Flooding
- Other conditions as determined by the OHSC or FM

See also Table 2 of this HSP, and the (Office) Ogden Emergency Action Plan.

Injury to Project Personnel or Visitors

Sound emergency alarm (continuous blast on a canned siren, vehicle horn, or direct verbal communication) to summon the ECs who will assess the situation, taking first necessary precautions for personal safety. The ECs will determine whether to transport the injured party to the (name of hospital), or summon an ambulance by calling 911 (see Pre-Planning). The Site Control and Security Measures will be implemented. Any off-site responding agencies will be given the Site Map, and informed about the site-specific hazards so that they can be optimally helpful in an emergency situation.

ECs will follow the Emergency Decon procedures and provide first aid to the extent possible while awaiting medical attention. In emergencies, the injuries and illnesses that may arise will vary from incident to incident; check the MSDS (Appendix 1) or contact the Poison Control Center for emergency first aid procedures. Medical treatment may range from bandaging of minor cuts and abrasions to lifesaving techniques, therefore, first aid/CPR training is required for all Ogden staff. The OHSC will serve as the primary care-giver and bloodborne pathogen officer (see also Bloodborne Pathogen Control Plan); but these duties are shared between qualified team members. It is essential that all site personnel in need of emergency care receive treatment. Appropriate documentation and notification will be discussed later in this section.

Spill of Hazardous Materials

There is a low potential for small quantity spillage/leakage of hazardous materials (fuels, grouts, detergents) that are brought onsite to implement site activities. These materials will be properly stored and the appropriate spill response equipment will be located, or easily accessible to, the area where the materials are used/stored. In case of a spill: notify the OHSC and FM; select appropriate PPE and response equipment; contain the spill to the extent possible; neutralize or contain the liquid as per the MSDS; transfer to an IDW container; document with an Incident Report (Appendix 2); and notify the ANGRC PM.

In the unlikely event that an existing Air National Guard structure containing hazardous materials is ruptured (UST, AST, pipeline, etc.), the EC will immediately contact the ANGRC PM to coordinate implementation of the Activity Emergency Response Plan. Ogden personnel shall not assist in Air National Guard emergency response activities, but will proceed to the Pre-arranged Safe Refuge Area(s) and implement the Site Security and Control Measures found in this section. If utility lines are disrupted, activate the Emergency Services Account (see call list); prepare report.

Fire or Explosion

Sound the emergency alarm (continuous blast on a canned siren, vehicle horn, or direct verbal communication) to summon the ECs who will decide whether to call the Fire Department for outside assistance (see Pre-Planning). Small-scale fires (< half of the responders height) should be extinguished with an accessible, ABC fire extinguisher by any team member who has received training. Fires in boreholes may be smothered with a fire blanket. Trained Emergency Crews will be summoned to control any large-scale or potentially unmanageable incident. Any off-site responding agencies will be given the Site Map, and briefed about the site-specific hazards so that they can be optimally helpful in an emergency situation. The EC will evacuate all non-response personnel and visitors to the Safe Refuge Area; will notify the ANGRC PM and the Ogden HSM and PM (see call list); and will complete the appropriate reports.

Accident Reporting and Recordkeeping

The OHSC will contact the HSM; conduct an investigation jointly with the FM; and complete the Supervisor's Report of Accident and First Aid Incident Report (Appendix 2). These completed reports must be transmitted to the HSM within 24 hours of an occurrence, a fax is acceptable. The HSM will submit the appropriate reports to the Ogden Human Resources department (for Workers Compensation); the Corporate HSM (as per Accident Reporting SOP HSP-1, HSMP); the Contracting Officer (as per contractual requirements); and OSHA (as applicable).

The foreman or field supervisor of subcontracting crews will investigate and complete an accident report (similar in content to the Ogden report) in accordance with their internal company policy. This report must be transmitted to the Subcontracts Administrator within 24 hours.

In case of environmental incidents, property damage, power disruption, or mandated work "shut-downs", an Incident Report (Appendix 2) will be prepared by the FM or Program Manager. Any damage, loss or theft of Government Property (items/tools/equipment purchased for ANGRC IRP will be reported to (___).

Any release of information in these reports is prohibited unless it is first approved by the ANGRC IRP Contracting Officer, (______). All media inquiries will be referred to (____). Review the Emergency Call List for additional contact names and phone numbers.

BLOODBORNE PATHOGEN EXPOSURE CONTROL PLAN

Exposure Determination:

First-aid responders have the potential to be exposed to bloodborne pathogens. The potential for exposure to bloodborne pathogens outside of emergency response is not anticipated.

Exposure Control (See Also Appendix 8):

Universal Precautions: Use of the Center for Disease Control "Universal Precautions" as an approach to infection control, which assumes that all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Personal Protection Equipment: While rendering first aid where exposure to blood may occur, Ogden employees will don, as a minimum, latex or blue nitrile gloves. Latex gloves will be available in the field first aid kit in a packet marked Vital 1 Econo-Kit. Other items included in the Vital 1 Econo-Kit that are to be used to control the "spill" are Vital 1 absorbent beads, a plastic scooper, a biohazard bag for waste, and surface disinfecting and hand cleaning towelettes. Other suggested PPE in the event of a serious blood-producing injury include safety glasses, Tyvek ™ coveralls, boot covers, and nitrile outer gloves - all of which should be available onsite. In addition, one-way CPR mask to prevent direct contact between the rescuer and recipient, will also be available in the first aid kit should the need arise.

Hepatitis B Vaccination: First aid providers to jobsite injuries do not need to receive a pre-exposure Hepatitis B vaccine. However, all first aid providers assessing in any situation involving the presence of blood - regardless of whether or not a specific exposure incident occurred - must be offered the full Hepatitis B immunization series no later than 24 hours after an incident.

Exposure Incident Evaluation: All first aid incidents involving exposures must be reported to the HSM before the end of the work shift in which the incident occurs. A First Aid Incident Report must be completed describing the circumstances of the accident and response in addition to the Supervisor's Report of Accident Form. Following a report of an exposure incident, Ogden shall provide to the exposed employee monitoring for HIV or HBV antibodies and medical counseling in cases of positive tests for HIV or HBV.

Waste Disposal:

Should biohazardous waste be generated as a result of a field related injury, the "contaminated" waste and area will be cleaned to the extent possible with items provided in the Vital 1 Econo-Kit and arrangements for the pick-up and final disposal of the waste will be made by calling (____).

HBV Vaccination Declination:

For whatever reason (religious, personal, or otherwise), employees may decline or refuse the HBVvaccination, by contacting the HSM. In instances where the vaccination is required, the employee will be required to sign a waiver (Attachment 2) indicating he/she has chosen at that time to refuse the vaccination, but may elect to do so in the future at no expense to him/her.

EMERGENCY REFERENCE LIST (Keep posted in vehicles and near communication system)

MEDICAL EMERGENCIES*: (See Hospital Route Map, Figure 4)

Hospital Name: Hospital Address:

Hospital Telephone: Directions:

EMERGENCY SERVICES:

Service	Name	Telephone Number
Ambulance		
Fire Department		
Security		
ESA (util. disruption)		
Poison Control Center		
Civil Defense		

CALL LIST:

Title	Name	Telephone Number
H&S Manager		
Program Manager		
Technical Director		
Program Manager		
Office HSC		
ANGRC PM		
OSHA		
Alexsis, Inc.*		

* In the event of an occupational accident or incident, please indicate to the medical facility that this is a Workers' Compensation case (Plan ID #110485/02715); that your employer is Ogden Allied; and that the insurance carrier is Alexsis, Inc. Subcontractors will provide internal Workers' Comp. policy information; this should be provided to the OHSC at the pre-work meeting.

EMERGENCY EQUIPMENT: Maintained in field vehicle (V), in the Clean Zone (CZ), except for * items which will be kept in the Exclusion Zone (EZ) and as applicable in the field trailer (FT). All items must be checked and maintained by the OHSC at least weekly or after used.

(√) First Aid Kit, V/FT	(√) Fire Extinguisher, V/EZ	( ) Field showers, FT or V
(√) SCBA, V/FT	( ) Escape Packs	(√) Alarms*, V/EZ
(√) Spill Equipment, V	(√) Mobile Phone, V/FT	(√) Fire Blanket*, V/EZ
( ) Other __________	(√) Hospital Route Map, V/FT	( ) Eye Wash

HOSPITAL ROUTE MAP

HEALTH AND SAFETY PLAN ACCEPTANCE

I have had the opportunity to read and ask questions about this HSP. My signature certifies that I understand the procedures, equipment, and restrictions of this plan and agree to abide by them.

Signature*	Printed Name	Company	Date

* This acceptance form is required for all routine site staff and subcontracting personnel. Visitors and non-routine subcontractors are required to receive and sign the appropriate Health and Safety Orientation Form located in Appendix 2.

APPENDIX 1

PROJECT SPECIFIC MATERIAL SAFETY DATA SHEETS AND/OR SELECTED CHEMICAL DATA SHEETS

OGDEN TAILGATE SAFETY MEETING REPORT

Date ______________________ Site ______________________________

Attendees ____

____

____

ORDER OF BUSINESS

Topic(s) discussed ____

____

____

Safety Suggestions ____

____

____

Action taken on previous meeting suggestions ____________________________

____

____

Emergency information ______________________________________

____

____

Injuries and accidents since previous meeting ____________________________

____

____

Additional comments ____

____

____

Meeting conducted by ________________ Title ________________

Signature ____________________________ Date/Time ____________

SITE VISITOR HEALTH AND SAFETY

ORIENTATION FORM

SITE ____

ONSITE HEALTH AND SAFETY COORDINATOR ____________________

SITE DESCRIPTION ___________________________________

____

____

____

____

____

POSSIBLE SITE CONTAMINANTS AND HAZARDS _______________

____

____

____

____

The information summarized below is important for you to read and fully understand. This information has been extracted from the site specific Health and Safety Plan, and has been compiled to help insure your health and safety onsite. If you have any questions regarding the information presented below, please ask your escort for clarification.

HEALTH SAFETY AND SECURITY INFORMATION

1. You must sign in and out of the Visitor Log Book maintained at the site. This assists in identifying all the visitors at the site in the event of an emergency.

2. If your business takes you beyond the designated VISITOR'S AREAS, you must be escorted. If you are observed unescorted in an unauthorized area, you will be asked to leave immediately.

3. Areas marked with yellow and black tape stating "CAUTION - DO NOT ENTER" demarcate where the Exclusion (contaminated) areas begin. You are not allowed to enter these areas.

4. Access to the contaminated area is strictly forbidden to all visitors unless they have approval of the Air National Guard and can produce adequate written proof of adequate training and medical certification prior to arrival onsite.

5. Hard hats and visitor safety glasses must be worn at all times onsite. Your escort will provide you with this safety equipment.

6. Please read and follow all safety signs onsite. The signs are there to alert you to possible physical and chemical hazards.

7. Eating and smoking is not allowed onsite. You may eat or smoke in designated clean areas or in your vehicle.

8. Please be cautious around heavy or moving equipment and vehicles.

9. Report any accident or injury to your escort.

10. No one under the age of 18 is permitted onsite without prior approval of the Air National Guard.

11. No domestic animals are permitted onsite.

EMERGENCY NOTIFICATION

1. In the event of a site emergency, please walk immediately to the designated meeting area for the site. You will receive further instructions from this location. Please stay in this meeting area until the all clear signal is given from the onsite Health and Safety Coordinator or offsite emergency support personnel.

2. Please cooperate fully with those in authority in the event of an emergency.

ACKNOWLEDGEMENT OF INFORMATION

I have read and understand the above information provided by Ogden and have had an opportunity to direct questions of a health and safety nature, and have received adequate answer or explanations from my escort or other site staff member.

Visitor Signature	Print Name	Affiliation	Date

SUBCONTRACTOR HEALTH AND SAFETY

ORIENTATION FORM

SITE ____

ONSITE HEALTH AND SAFETY COORDINATOR ____________________

SITE DESCRIPTION ____________________________________

____

____

____

____

____

POSSIBLE SITE CONTAMINANTS AND HAZARDS ________________

____

____

____

____

The information summarized below is important for you to read and fully understand. This information has been extracted from the site specific Health and Safety Plan, and has been compiled to help insure your health and safety onsite. If you have any questions regarding the information presented below, please ask your escort for clarification.

HEALTH SAFETY AND SECURITY INFORMATION

1. All subcontracting personnel must acknowledge their presence onsite by checking in with the Onsite Health and Safety Coordinator. This assists in identifying all the personnel at the site in the event of an emergency.

2. All subcontracting personnel will be restricted to their "contracted" area(s). Do not enter any of the contaminated areas (marked with yellow and black caution tape) unless you have been authorized by site management and are wearing the proper protective equipment.

3. Hard hats, safety glasses and safety boots are REQUIRED to be worn while you are working onsite.

4. Please read and heed all safety signs onsite. These signs are there to alert you to possible physical and chemical hazards.

5. Eating and smoking is not allowed onsite. You may eat or smoke in designated clean areas or in your vehicle.

6. Shirts are required at all times; long-sleeved shirts are preferred.

7. Before beginning any HOT WORK (welding, burning and grinding) you must notify the Onsite Health and Safety Officer. The work area must be checked for flammable and combustibles, and to be sure that the proper fire extinguisher is close by before the beginning of the hot work.

8. Observe the proper lookout, tag-out procedure before working on electrical and/or rotating equipment.

9. Normal subcontractor shift hours coincide with the regular Ogden work schedule.

10. Report any accident or injury (even if minor to you) to the Onsite Health and Safety Coordinator.

11. No one under the age of 18 is permitted onsite without prior approval of the Air National Guard.

12. No domestic animals are permitted onsite.

13. Complete cooperation with the Health and Safety Plan must be maintained. Any violation may result in expulsion from the site.

14. In the event of an onsite emergency, please walk immediately to the designated meeting area for the site. You will receive further instructions from this location. Please stay in the meeting area until the all clear signal is given from the Onsite Health and Safety Coordinator or off-site emergency support personnel.

15. Please cooperate fully with those in authority in the event of an emergency.

ACKNOWLEDGEMENT OF INFORMATION

I have read and understand the above information provided by Ogden and have had an opportunity to direct questions of a health and safety nature, and have received adequate answer or explanations from my escort or other site staff member.

Subcontractor Signature	Print Name	Affiliation	Date

INSTRUMENT CALIBRATION LOG

(LOCATION PROJECT)

JOB # ____________________

Date/Time	Instrument	Serial Number	Span Gas Substance	Span Conc.	Instrument Reading at Calibration	Instrument Reading After Calibration	Comments

SITE AIR SURVEILLANCE RECORD

SITE INFORMATION PROJECT #: SITE MANAGER:	DATE: H&S COORDINATOR:	Page ____ of ____ SITE LOCATION:
SITE CONDITIONS TEMPERATURE: RELATIVE HUMIDITY: WIND SPEED & DIRECTION:	SITE PERSONNEL:	

SAMPLE NO.	TIME	SAMPLE DESCRIPTION	LOCATION	INSTRUMENT	READING	COMMENTS

Page _____ of _____

SAMPLE No.	TIME	SAMPLE DESCRIPTION	LOCATION	INSTRUMENT	READING	COMMENTS

WORKPLACE EXPOSURE MONITORING RECORD

Name: ____________________
Soc. Sec. No.: ____________________
Employer/Office: ____________________
Job Function: ____________________

Project No.: ____________________
Project Name: ____________________
Project Dates: ____________________
Project Location: ____________________

SAMPLING METHOD:

- ☐ Adsorber : ____________
- ☐ Detector Tube: ____________
- ☐ Dosimeter Badge: ____________
- ☐ Filter: ____________
- ☐ Impinger: ____________
- ☐ Meter: ____________
- ☐ Other: ____________

SAMPLE TYPE:

- ☐ Area
- ☐ Background
- ☐ Biological
- ☐ Personal

WORK ZONE:

- ☐ Contamination Reduction
- ☐ Exclusion
- ☐ Support
- ☐ Other ____________

SAMPLE COLLECTION:

Sample No.: ____________
Instrument Make/Model: ____________
Calibration Date: ____________
Sample Date: ____________
Collected By: ____________
Analyzed By: ____________
(Use reverse side for calculations and sketches as necessary)

Sample Duration: ____________ (min.)
Sample Rate: ____________ (L/min.)
Sample Vol.: ____________ (L)

ATMOSPHERIC CONDITIONS:

Humidity (%): ☐ Low 0-30 ☐ Med 30-70 ☐ High 70-100
Wind (mph): ☐ Light 0-5 ☐ Moderate 5-20 ☐ High >20
Temp.: ________ °F Direction: ____________

ANALYTICAL RESULTS:

Contaminant	Concentration	Units	Analytical Method	Detection Limit

PPE WORN: (√ = Yes)

- ☐ Half-Face Purifying Respirator
- ☐ Full-Face Purifying Respirator
- ☐ Air Supplied Respirator
- ☐ Disposable Respirator
- ☐ Chemical Cartridge
- ☐ HEPA Cartridge
- ☐ Disposable Coverall
- ☐ Chemical Gloves
- ☐ Chemical Boots
- ☐ Slicker
- ☐ Unknown
- ☐ Safety Glasses
- ☐ Goggles
- ☐ Hearing Protection
- ☐ Other ____________

OTHER REPRESENTATIVE PERSONNEL:

____________ ____________
____________ ____________
____________ ____________

GENERAL COMMENTS:

____
____
____

Distribution: H & S Personnel File, Project File, Employee, Other ____________

FIRST AID INCIDENT REPORT

Date of Report: Date of Accident/Incident:	Report Completed by:

Description of the Accident/Incident: (time, location, event, description of injuries)

Name of Injured Person: 	Employer:

Name of First Aid Providers(s): 	Social Security No.:

Bloodborne Pathogen Exposure Incident Evaluation:

1. Was the First Aid Responder exposed to blood or other potentially infectious materials?

   - ☐ Exposure Occurred (see question 2)
   - ☐ No Exposure

2. Exposure occurred by contact with the following (check all that apply):

   - ☐ Eye
   - ☐ Mouth
   - ☐ Other Mucous Membrane
   - ☐ Non Intact Skin (cuts, abrasions)
   - ☐ Needlestick
   - ☐ Human Bite

Exposure Control Precautions Taken (check all that apply):

- ☐ Gloves
- ☐ Face Mask
- ☐ One-way CPR valve
- ☐ Eye Protection
- ☐ Immediate Personal Hygiene
- ☐ Previous HBV Immunization
- ☐ Recommended for HBV Immunization
- ☐ Other ______________________

Please attach this completed form to the Supervisor's First Report of Injury and forward to Human Resources and your Office Health and Safety Coordinator or, as applicable, to the ANGRC Health and Safety Manager (HSM).

OGDEN/ANGRC IRP
INCIDENT REPORT

Report No.:	Report Date: ___/___/___	Incident Date: ___/___/___
Project Title and Location:	Project Number:	
Location of Incident:		
Names of all personnel involved:		
Names of witnesses/ relationship to the incident/ where they can be reached: __________/__________/__________ __________/__________/__________ __________/__________/__________		
Describe the incident as it occurred (Use additional sheets if necessary.)		
PROJECT IMPLICATIONS		
What is the cost impact to the project?		
What is the schedule impact to the project?		

Does the incident impact the scope of the project in other ways? If so, how?

Fully explain what allowed or caused the incident.(Include direct and indirect causes) (Use additional sheets of paper if necessary)
ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S)
DATES FOR ACTIONS IDENTIFIED ABOVE
Beginning (Month/Day/Year) __/__/__ Anticipated Completion __/__/__
Signature and Title of Manager Completing Report: ____________________ ____________________/__/__   Name and Title (Please Print) Signature and Date

HEPATITIS B (HBV) VACCINATION DECLINATION

In accordance with 29 CFR 1910.1030, I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with the hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

_______________________________ Signature

_______________________________ Date

_______________________________ Printed Name

Distribution:

Corporate Health and Safety Manager
ANGRC Health and Safety Manager
Human Resources Manager

OrODY POND

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using a MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m³	2.5 mg/m³	N.A.
Nitrate	0.02 mg/m³	0.01 mg/m³	N.A.
Arsenic (As)	0.01 mg/m³	0.005 mg/m³	0.011 ppm

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m³ (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m³ (PM<10μ) .

Justification:

Assumptions:

1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 0.011 ppm/w arsenic.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$0.011 \ \frac{\text{mg (As)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 2.2 \times 10^{-8} \ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (2.2×10^{-8} mg/m³) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust Arsenic and Nitrates and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Hydrazine in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Hydrazine	0.1 ppm	0.05 ppm	N.A.
Formaldehyde	0.30 ppm	0.15 ppm	N.A.
2-Butanone (MEK)	200 ppm	100 ppm	N.A.

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:

1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs ≤ 10.6 eV (not compound-specific in multi-gas atmospheres).

2) Instrument over-responds to 2-Butanone relative to the calibration gas.

3) Since 100 is the action level for 2-Butanone, Colorimetric tubes will be used to verify Hydrazine concentrations; Level C upgrade at any detection (include safety factor).

4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.

5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.

6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for 2-Butanone and Hydrazine and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components.

N.A. = Not Available

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level B PPE upgrade = 75% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (3/4 PEL)	Highest Conc.
Pyrene	0.024 ppm	0.018 ppm	4 ppm
TFH (gasoline)	300 ppm	225 ppm	5,000 ppm
Benzene	1 ppm	0.05 ppm	N.A.

Level C PPE Action Level for TVH above background as measured in the breathing zone = 200 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 50 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs ≤ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to TFH (1.6 for gasoline) relative to the calibration gas.
3) Since 150 is the action level for gasoline, Colorimetric tubes will be used to verify Benzene concentrations; Level B upgrade at 200 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for gasoline and also includes a safety factor for instrument response, concentration variability, and for biogenic breakdown components.

N.A. = Not Available

OILY WASTE LANDFARM

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Assumed Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	N.A.
PCBs (1254)	0.5 mg/m^3	0.25 mg/m^3	N.A.
Lead (Pb)	0.05 mg/m^3	0.025 mg/m^3	10,000 mg/m^3

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 ($PM<10\mu$) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 ($PM<10\mu$) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 10,000 ppm/w lead.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$10{,}000\ \frac{\text{mg (Pb)}}{\text{kg (soil)}} * 2\ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1\ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 0.02\ \frac{\text{mg (Pb/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (0.02 mg/m^3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, Pb, and PCBs and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

CORAL PIT 3

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m³	2.5 mg/m³	
comp.			
comp.			

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m³ (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m³ (PM<10μ) .

Justification:

Assumptions:

1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs ≤ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

FORMER SEWAGE TREATMENT PLANT

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 (PM<10μ) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs ≤ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

FORMER FIRING RANGE

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

> Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 ($PM<10\mu$) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 ($PM<10\mu$) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \; \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \; \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \; \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1 \; \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs ≤ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

GOLF EQUIPMENT MAINTENANCE SHOP - BLDG. 1089

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 ($PM<10\mu$) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 ($PM<10\mu$) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6 \text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3 \text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs $\leq$ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

NEX SERVICE STATION - BLDG. 129 AST

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 (PM<10μ) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000\ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2\ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1\ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1\ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs $\leq$ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

MWR WAREHOUSE

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 (PM<10μ) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs ≤ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

RUNWAY 11 CLEAR ZONE

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 (PM<10μ) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3 \text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6 \text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3 \text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

> Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs $\leq$ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

STORM-WATER DRAINAGE DITCH

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m³	2.5 mg/m³	
comp.			
comp.			

> Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m³ (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m³ (PM<10μ) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs $\leq$ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

TRANSFORMER SUBSTATION SYSTEM

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

> Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 (PM<10μ) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3 \text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6 \text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3 \text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:

1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs ≤ 10.6 eV (not compound-specific in multi-gas atmospheres).

2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.

3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).

4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.

5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.

6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

> Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 ($PM<10\mu$) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 ($PM<10\mu$) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs $\leq$ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

CORAL SEA ROAD CORAL PIT

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

> Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 (PM<10μ) .

<u>Justification:</u>

Assumptions:

1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

<u>Justification Ex</u>:

$$500{,}000 \;\; \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2\, \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1\, \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1\, \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

<u>Summary</u>:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs $\leq$ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

FIRE FIGHTING TRAINING PIT

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 (PM<10μ) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 (PM<10μ) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000\ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2\ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1\ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1\ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs ≤ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

REGIONAL GROUND-WATER SYSTEM

JUSTIFICATION OF THE LEVELS OF (RESPIRATORY) PROTECTION USING DIRECT READING INSTRUMENTATION (DRI) AND ACTION LEVELS.

Establishment of Action Levels for Dust using an MIE MiniRAM PDM3:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Respirable Nuisance Dust & Principal Contaminant (type of comp. in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Resp. Dust	5 mg/m^3	2.5 mg/m^3	
comp.			
comp.			

Level C PPE Action Level for potentially contaminated dust is set at 2 mg/m^3 ($PM<10\mu$) above background measured in personnel breathing zone. Work stoppage Action Level for dusts at the site perimeter is 0.5 mg/m^3 ($PM<10\mu$) .

Justification:

Assumptions:
1) Generated dust concentrations are 100% respirable/inhalable (< 10 microns*).
2) Generated dusts are contaminated with 500,000 ppm/w _______.
3) Complete mixing efficiency of dust and contaminants in air.
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are 1/3 work zone action levels based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Particle size range of MiniRAM personal dust monitor is 0.1 - 10 microns (μ).

Justification Ex:

$$500{,}000 \ \frac{\text{mg (solv)}}{\text{kg (soil)}} * 2 \ \frac{\text{mg (soil dust)}}{\text{m}^3\text{ (air)}} * 1 \ \frac{\text{kg (conv)}}{10^6\text{ mg}} = 1 \ \frac{\text{mg (solv/dust)}}{\text{m}^3\text{ (air)}}$$

This derived concentration (1 mg/m3) does not exceed Action Levels for dust or contaminants.

Summary:

These DRI action levels do not exceed those established for dust, PCE and Stoddard solvent and include a safety factor for instrument response and contamination variability.

N.A. = Not Available

Establishment of Action Levels for Total Volatile Hydrocarbons (TVH) using a Thermo 580B PID, 10.6 eV lamp, Calibrated to ~100 ppm Isobutylene:

Action Levels for Level C PPE upgrade = 50% of the OSHA PEL

Principal Contaminant (Dry Cleaning Solvents in soils) PELs:

Contaminant	PEL	Action Level (1/2 PEL)	Highest Conc.
Comp.			
Comp.			

Level C PPE Action Level for TVH above background as measured in the breathing zone = 25 units (ppm-equiv.). Work stoppages for TVH at the work zone perimeter = 5 units (ppm-equiv.).

Justification:

Assumptions:
1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs $\leq$ 10.6 eV (not compound-specific in multi-gas atmospheres).
2) Instrument over-responds to chlorinated hydrocarbons (1.4 for PCE) relative to the calibration gas.
3) Since 25 is the action level for PCE, Colorimetric tubes will be used to verify PCE concentrations; Level C upgrade at 10 ppm (include safety factor).
4) Anticipated trade winds between 5-15 mph and discontinuous exposures would not produce an 8-hour TWA exposure >PELs.
5) Historical data for similar contaminants produced during trenching and drilling did not produce employee exposures > PEL.
6) Perimeter action levels are generally 1/3 work zone action level (plus a safety factor) based on a 24 hr exposure, no ability to upgrade, and lower health status generalizations.

Summary:

DRI action levels for TVH do not exceed those established for PCE and Stoddard solvent and also include a safety factor for instrument response, concentration variability, and for biogenic breakdown components (see attached table of soil gas results).

N.A. = Not Available

STANDARD SAFE WORK PRACTICES
FOR
EQUIPMENT OPERATION

1.0 INTRODUCTION

The purpose of this standard is to present the minimum safety performance requirements for the operation of Subcontractor's equipment on Ogden projects. It is intended to provide the framework necessary for the safe implementation of the Ogden site-specific health and safety plan (HSP). The HSP will be presented to the Subcontractor upon award of this solicitation. These practices do not encompass all pertinent safety-related regulations, and therefore do not exempt the Subcontractor from full compliance with all applicable laws, ordinances, rules and regulations of federal, state and local authorities regarding the project scope of work.

The Subcontractor is solely responsible for compliance by its employees, agents and persons under their direction, with the Ogden site-specific HSP, to which these guidelines appear as Appendix 4. Any conflicts with the Subcontractor's internal safety policies, procedures, and safe work practices must be resolved through the Ogden Purchasing Department and the ANGRC IRP Health and Safety Manager (HSM).

1.1 Health and Safety Certifications

In accordance with OSHA 29 CFR 1910.120, the Subcontractor must have and maintain a hazardous waste health and safety program in which training and medical monitoring is required and conducted. Specifically:

- With limited exceptions, namely geophysical and land surveyors, all Subcontractor site personnel will have completed the OSHA 40-hour classroom training in hazardous waste operations and emergency response (HAZWOPER); 24-hours of onsite supervised training (OJT); and annual (within 12 months) updates as required. Training requirements are specified in the Site Specific HSP.

- All Subcontractor site personnel will participate in a medical surveillance program suitable for hazardous waste work, and should have a current Tetanus shot. Additional tests, if any, will be specified in the Site Specific HSP.

- The Subcontractor shall submit the completed OSHA training and medical surveillance table to the Ogden Purchasing Department and the ANGRC IRP Health and Safety Manager certifying by name and social security number that all site personnel under their direction, including second tier subcontractors, have met the training and medical requirements listed above. This table appears as Appendix A to the Request for Proposal (RFP) and also as Attachment 4 to this document.

  - The certification table must be submitted prior to mobilization of field crews.

  - The certification table is not the same as the base access request.

  - The certification table shall be revised accordingly with any additions to, or substitutions of, previously certified personnel.

  - It is suggested that all potential (qualified) alternate personnel be placed on this list, to reduce the number of submittals.

Ogden assumes that all prerequisite OSHA programs necessary to conduct projects of this scope, i.e., Respiratory Protection, Hearing Conservation, Hazard Communication, Hazardous Waste Operations and Emergency Response, and equipment-specific standard operating procedures (SOPs), etc., are in-place. Ogden reserves the right to review these programs.

1.2 Standard Work Clothing and Protective Equipment

Certain personal protective equipment (PPE) must be worn because of the physical or chemical hazards posed by work tasks or equipment operation at potentially hazardous locations. All personnel entering controlled work zones will be required to wear the PPE specified in the HSP. PPE listed in the HSP for specific work tasks shall take priority over these guidelines. Any upgrade in the level of protection not included in this Statement of Work (SOW) is to be quoted as a separate line item to this RFP. All necessary and appropriate protective equipment and safety devices shall be provided by respective employer(s).

Clothing. Clothing should be close fitting, but comfortable, without loose ends, straps, drawstrings or belts, or otherwise unfastened parts that might catch in rotating equipment. In warm climates, cotton clothing is suggested to help combat heat strain and stress. Shorts are unacceptable as standard work clothing.

Protective Coveralls. Protective coveralls (e.g., Tyvek™) are generally required for most tasks involving potential contact with hazardous substances. Tyvek™ may not be tied at the waist for any reason. Tyvek™ pants, or equivalent, should be worn for protection of dirt and debris (non-contaminated) from the waist and down.

Safety Shoes or Boots. Safety shoes or boots shall be worn by all site personnel in controlled work zones at project sites. All safety shoes and boots must meet the requirements of ANSI Z41.1.

Safety Head Gear. Hard hats must be worn by everyone working within the radius of the mast height of the drill rig; on or around heavy equipment; in the presence of overhead or bump hazards; and/or as specified by the client or in the Site Specific HSP. All safety hats should meet the requirements of ANSI Z89.1.

Gloves. Work gloves should be worn for protection against cuts and abrasions while handling non-contaminated tools and equipment. Chemical protective outer and inner gloves will be specified in the Site Specific HSP. For costing purposes, nitrile outer gloves are generally selected for total petroleum and fuel hydrocarbons and PVC gloves are selected for use with acids and caustics. A second pair of inner gloves, typically nitrile or vinyl, are to be worn beneath chemical outer gloves. In addition to the double gloves, cotton glove liners may also be worn (optional) to absorb persperation.

Eye and Face Protection. All site personnel must wear safety glasses that meet the requirements of ANSI Z87.1. Side shields are required for drilling and other operations generating flying debris. Goggles and face shields should be on hand for certain tasks, e.g., grouting or steam cleaning.

Hearing Protection. Hearing protection appropriate for the task shall be worn during operation of heavy equipment (including rigs), pneumatic power tools, steam cleaners, and other equipment that have the potential to generate noise levels exceeding 85 dB(A).

Other. Rings and jewelry should not be worn during a work shift. Loose hair extending below the collar must be secured so that it will not be caught in rotating or moving equipment.

Respiratory Protection. The need for respiratory protection is always a potential for projects of this scope. The SOW will specify the predominant level of protection necessary for costing purposes. Levels C and B indicate respiratory protection. Only NIOSH-approved respirators and components shall be used. Certain tasks requiring confined space entry, e.g. tank entry, may also require a self contained breathing apparatus (SCBA) or air-supplied respirators. Approved dust respirators will be required during mixing of grout and cement, and other caustic and/or silica-containing materials.

1.3 Housekeeping

Good housekeeping is essential for safe field operations. Your working place must be kept in a clean and orderly condition. Unused materials must be stacked or stored in designated staging areas. Scraps, rags, paper, or any other combustible materials must be disposed of daily. Tools and equipment should be stored in a manner that permits convenient access but also provides for personnel safety.

- Items such as hand tools, rakes, shovels, etc., shall not be left lying on the ground to pose a trip hazard.

- Excess pipe, augers, connections, etc., should be stored in a rack and not left lying around the rig.

- Remove and dispose of empty bags or other containers which have held drilling mud, cement or other dust producing materials.

- To allow good visibility, all brush within a ten foot radius of drilling operations shall be cut.

- Site entry/exit pathways, as well as work areas in the exclusion zone and decontamination area, shall be defined and kept clear and free of debris.

- Items such as pallets may be used as work platforms or walkways to provide better footing in wet or muddy work areas.

- Keep platforms, stairs, and the immediate area surrounding a drill rig clean.

- Do not allow oils, grease, mud, and tripping material to accumulate on floors, walkways or steps. Use approved cleaning solvents (not gasoline) for cleaning.

1.4 Accident Reporting

The foreman or field supervisor of all crews will investigate and complete an accident report in accordance with their internal company policy. This report must be transmitted to the Subcontracts Administrator and the HSM within 24 hours.

- All occupational injuries, illnesses, and "near-miss" accidents will be reported to, and investigated by, the Subcontractor's Supervisor and the Ogden Onsite Health and Safety Coordinator (OHSC).

- Accidents and near-misses considered serious may also require submittal of a formalized Corrective Action Plan, as per the OHSC, HSM, Field Manager (FM), and/or the Client.

- Subcontractors shall provide their Workers' Compensation policy and any other information necessary to receive emergency medical treatment. This should be provided to the OHSC at the pre-work meeting.

2.0 HAND AND POWER TOOLS

There are numerous hand tools with a number of instructions for proper use that can be used on these projects. The most important rule to remember is **"Use the tool for its intended purpose only"**. Some other important rules include:

- If a tool becomes damaged, repair or dispose of it.

- All hand and power tools and similar equipment, shall be maintained in a safe condition.

- Power tools designed with guards, shall be equipped with such guards when in use.

- Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded if such parts are exposed to contact by employees or otherwise create a hazard.

- When using impact tools, such as a hammer, always wear safety glasses.

- Keep all pipe wrenches clean and in good repair.

- Wrenches, including adjustable, pipe, end, and socket wrenches shall not be used when jaws are sprung to the point that slippage occurs.

- Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.

- The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

- Never use pipe wrenches as a rod holding device.

- When breaking tool joints on the ground, keep hands clear.

- Never throw or drop tools; they should be carefully passed by hand or rope.

- Electric power-operated tools shall either be of the approved double-insulated type or grounded in accordance with Federal Regulations.

- Compressed air shall not be used for cleaning purposes.

- All fuel powered tools shall be stopped while being refueled, serviced, or maintained. An fuel shall be transported, handled, and stored in accordance with Federal Regulations.

3.0 HEAVY EQUIPMENT OPERATIONS

The Subcontractor's equipment shall comply with all applicable requirements for motor vehicles and material handling heavy equipment as per the OSHA Construction Industry Standards in 29 CFR 1926 Subpart O. For purposes of this contract, the definition of heavy equipment includes drill rigs, front end loaders, backhoes, trackhoes, bulldozers, forklifts and similar equipment used for the implementation of the project SOW.

3.1 Equipment Safety Inspections

- Equipment will be inspected on a daily basis by the owner/operator, daily logs will be maintained. All discrepancies shall be corrected prior to placing the equipment in service.

- The inspections shall include, but are not limited to: all hydraulic lines and fittings for wear and damage, all cable systems and pull ropes for damage and proper installation, exhaust systems, brake systems, and drill controls, etc.

- Drill rigs and related support equipment and vehicles shall be inspected by the driller in charge on a daily basis. These inspections shall be recorded on the Daily Drill Rig Checklist (Attachment B-1); or on equivalent subcontractor forms.

- The Daily Drill Rig Inspection will be enforced by the OHSC or designee.

- Exhaustive preventive maintenance shall be conducted for all equipment according to the Subcontractor's internal policies, schedules and equipment SOPs.

3.2 Overhead and Buried Utility Lines

The use of a drill rig and other heavy equipment within the vicinity of electrical power lines and other overhead and underground utilities requires that special precautions be taken by the Subcontractor.

- Buried and overhead utilities should be located before the start of drilling.

- All overhead lines should be treated as being energized or "live".

- Confirm exact location of lines with hand tools, not heavy equipment; these worker(s) should wear rubber insulated protective gloves.

- The minimum distance required between drilling masts and overhead power lines <50 kv is 20 ft, unless the lines have been de-energized and visibly grounded at the point of work; or are equipped with insulated barriers to prevent physical contact. (NOTE: Ogden recommends that the Utility Company be contacted when the distance is less than 30 feet so that they can de-energize or insulated with barriers.)

- Do not move the drill rig while the mast is in the upright position.

- Always ground the drill rig.

- Subcontractors must open their own Emergency Services Account (ESA) for the purpose of summoning Public Works Center (PWC) response crews in case of utility disruption.

3.3 General Operating Rules

Most of these requirements can also be located in OSHA 29 CFR 1910.1926. Any abnormalities, such as equipment failure, oozing liquids, and unusual odors, must be reported to the Subcontractor's Supervisor and the OHSC.

- Only qualified, adequately trained, and licensed personnel will operate heavy equipment.
- For on-road operation, the operator should be DOT-qualified and have a commercial driver's license (CDL).
- Equipment parked on inclines shall have the wheels chocked and the parking brake set.
- Equipment shall not be used on unstable or unsafe inclines. Level jacks shall be set before lifting the derrick on drill rigs.
- Increase communication effectiveness with operators using hand signals, radios (as appropriate), and line-of-sight confirmation.
- Workers will not assume that the equipment operator is keeping track of their exact location. Workers should not walk directly behind, or to the side of, heavy equipment without the operator's knowledge.
- Workers must maintain visual contact with equipment operators at all times.
- When an operator must maneuver equipment in tight quarters, the presence of a second person will be required to ensure adequate clearance. If much backing is required, two ground guides will be used: one in the direction the equipment is moving, and the other in the operator's normal field of vision to relay signals.
- All heavy equipment will be kept in the exclusion zone until the work or shift has been completed. Such equipment will then be decontaminated within the designated decontamination area.
- Hand-signal communications will be established when verbal communication is difficult. One person per work team will be designated to give hand signals to equipment operators.
- Equipment with an obstructed rear view must have an audible alarm that sounds when the equipment is moving in reverse (unless a spotter guides the operator).

- The motor must be shut off and the parking brakes kept engaged when equipment is not in use.

- Blades, buckets, dump bodies, and other hydraulic systems will be kept fully lowered when equipment is not in use.

- Equipment cabs will be kept free of all nonessential and loose items.

- All material-handling equipment (unless excluded by regulation) will be provided with rollover protection systems (ROPS).

- Seat belts must be present in all vehicles having ROPS.

- Material-handling equipment that lacks a ROPS will not be operated on a grade unless the grade can safely accommodate the equipment involved.

- If not backfilled or capped, cover and suitably barricade unattended boreholes and/or excavations, according to the Site Specific HSP or as per OHSC instructions.

- Contractor's personnel shall not consume, or be under the influence of alcoholic beverages, depressants, or any stimulants, including doctor-prescribed medications, while operating heavy equipment.

- The presence of any intoxicating substances onsite is strictly prohibited even if kept in personal vehicles.

3.4 Additional Considerations for Drilling Operations

Clearing the Work Area. Prior to drill rig set up, adequate site clearing and leveling should be performed to accommodate the drill rig and supplies and provide a safe working area. Drilling should not be commenced when tree limbs, unstable ground, or site obstructions cause unsafe equipment handling conditions.

- Clear work area of obstructions and debris prior to rig set-up.

- Level and stabilize the rig prior to raising the mast.

- Timbers may be used when necessary to stabilize and level the drilling rig, but must not result in an unstable working platform.

- Site grading may be required if the working platform is unstable.

- The Subcontractor shall place a sheet of polyethylene completely under the rear end of the drill rig to catch any contamination resulting from drilling activities and protect the surrounding area. The plastic shall be used only once per well and shall be placed into 55-gallon, DOT 17-H drums for disposal after use.

- Keep drill platforms, stairs, and immediate work areas clear; do not allow oil/grease and excessive mud to accumulate in these areas.

- The discharge of drilling fluids and foam will be channeled away from the work area to prevent ponding or slippery conditions.

Start Up. After completion of drill rig inspection, the following shall apply.

- Ensure that all gear boxes, hoist levels, and hydraulic levers are in the neutral position.

- Ensure that cathead rope or catline is not on the cathead before starting the engine.

- All drill rig personnel and visitors should be instructed to "stand clear" of the drill rig immediately prior to and during starting of an engine.

Drilling Rig Work Practices. The following is an overview of safe drill rig work practices for reference only. The drill rig operator is expected to have superior knowledge of the safe operation of the rig and its appurtenances, and should perform accordingly.

- During site activities, the minimum drilling crew to be employed will consist of one trained, experienced driller and one helper.

- The drill crew and the OHSC will be aware of the location and proper operation of the rig's emergency shut-down equipment (kill-switches, etc.), and procedures.

- Watch for slippery ground when mounting/dismounting the platform.

- Set the brakes and/or block the wheels when the rig is set up at a site.

- A drill rig should only be operated from the position of the controls.

- Clean mud and grease from boots before mounting a drill platform.

- Never leave the drill rig while it is still running.
- Ogden personnel (geologists, engineers, etc.) will not assist the drill crew with their work while the drill rig is operating.

- Subcontractors shall ensure, however, that Ogden personnel know how to turn off drilling equipment in case of an emergency.

- Extreme care will be used during addition or removal of augers and casings and during startup of rotating drilling equipment (such as hollow-stem augers, rotary tables, and catheads).

- Dry drilling is prohibited unless a dust collection system or other dust-alleviating methods are used. Dust suppression techniques will be employed to minimize the generation of dust/particulates and associated contaminantes into the atmosphere, to the greatest extent possible. A water tap should be fitted with a nozzle or other device to create a water spray or curtain to contain dusts

- No petroleum-based grease or oil shall be used on auger pipe joints; however, Teflon grease or vegetable oil is acceptable.

- Drill rods or core barrels should never be left unsecured, balanced across, or leaning onto the rig.

- Operators should keep body and hands out of line of the auger end from which the core is being extruded.

- When moving a rig off-road, pay particular attention to obstacles in the route of travel. It is wise to walk the route first. Walk around the rig before demobilization to check for obstacles.

- Have an assistant guide the driver when in close proximity to hazards or if clearance is at a minimum.

- Do not move drill rigs up or down steep slopes without the assistance of a dozer tagging it off.

- All-terrain vehicles (with balloon tires) can not stop quickly on wet ground, therefore allowances should be made to ensure their safe use.

- All unattended boreholes must be adequately covered.

Derricks/Masts.

- Before raising the mast, look for overhead obstructions.

- Before raising the mast, make sure the drill rig is leveled and stabilized.

- Before drilling, lock the mast in place.

- Do not move the drill rig with the mast raised.

- All loose tools and materials shall be removed or secured, and no worker shall be allowed under the derrick while it is lowered or raised.

- All derricks and portable masts should be equipped with approved fixed ladders to provide access to all working areas from the floor to the crown. Drill rig masts shall not be used as ladders.

- Rig personnel should always face the ladder when ascending or descending.

- Unless ascending or descending a mast or derrick by means of ladder fitted with safety hoops to approved OSHA standards, no person should attempt to ascend or descend unless wearing an approved full-body harness with shock absorbing capabilities, that is correctly fitted, adjusted, and attached to a mobile safety climbing device (rope or cable). Workers should be instructed in the correct procedures by a competent person.

- A full-body harness and lifeline should be provided and its use required for each employee who works 6 ft. or more above the floor or main work deck.

<u>Hollow Stem Auger Drilling</u>. Handle augers with care. Serious injury or death can result from being caught or pinched in rotating equipment, or from improper lifting of augers.

- Use proper lifting technique; use a tool hoist if possible.

- Stay clear of rotating augers and pinch points, such as cables and pulleys.

- Passage under, or stopping over, a moving stem or auger is prohibited.

- Drill crews are not allowed on the mast while the drill bit/auger is in operation or during transport.

- Only <u>long-handled</u> shovels will be used to remove cuttings from the auger.

<u>Split-Spoon Sampling</u>. Split-spoon soil sampling requires an impact hammer connected to a pull rope, which is wound around a cathead pulley, be used to drive the split-spoon sampler into the hole to collect soil samples at various depths. The pull rope is manually pulled and released to lift and drop the hammer, driving the sampler into the soil. The following precautions shall be adhered to during split spoon sampling:

- Workers who operate the driving hammer shall be thoroughly trained in the proper use of the impact hammer. Only drillers who are thoroughly trained and experienced shall operate the pull rope to drive down and pull up the sampling device.

- No one shall bend down or stand directly below the hammer while sample driving or removing is in process.

- If the sample rod must be kept straight and steady, a mechanical holding device shall be attached to the drilling rig to support the sampling rod and drive the hammer.

- Before each use, the pull rope shall be inspected for wear; the knot securing the rope to the hammer will be checked to verify that it is securely tied.

- Pull ropes shall be replaced if the inspection reveals signs of severe wear such as fraying, etc.

- Before each use, the driller, along with his helper, shall inspect the sample rod for cracks and other signs of severe wear.

- Rods shall be replaced and shall not be used if they are found to be cracked or otherwise damaged.

- The hammer shall be inspected before each use. Particular attention shall be given to welded areas (i.e., the handle used to attach the pull rope).

- Hearing protection is mandatory while driving split-spoons.

<u>Catheads and Rope Hoists</u>. Catheads are extremely dangerous. Damaged catheads should be replaced so as to not further jeopardize worker safety.

- If a cathead is mounted on the end of a shaft which projects beyond the guard for other moving parts of machinery, the shaft end, or the key, or other device for securing the cathead to the shaft, should be covered with a smooth thimble. The thimble should be of such design that a rope cannot wind around it.

- Catheads on which the catline is manually wound should have a reasonably smooth surface, be equipped with a divider for separating the first wrap of the catline from subsequent wraps, and be free of projections on which an employee's clothing might be caught during operation of the catline.

- In the event of fouling, no attempt should be made to free the line while a cathead is in motion.

- While operating the cathead, the operator will be on a slip-free surface.

- The catline must be of the right length, be clean and preferably dry, and be sound.

- Not more than one wrap should be put on a cathead until all slack has been taken up and initial tension has been applied.

- While the rope is wrapped on the drum, the cathead must always be attended.

- The catline must never be wrapped around any part of your body.

- Use an adequate amount of wraps on the cathead to hoist the load.

- The cathead barrel must be kept free of rust, grease, and rope grooves.

- Loose clothing or loose gloves may not be worn while operating the cathead.

- An adequate amount of clearance must be maintained between other hoist lines to prevent contact with the catline.

- An adequate amount of clearance must be maintained between personnel and the impact hammer.

- Personnel must keep at least 18 inches away from the cathead drum at all times while it is in operation.

Wireline Hoists

- Use tool handling hoist only for vertical lifting of tools, not for pulling vehicles..

- Before lifting any object using a hoist, make sure the load is within lifting capacity.

- Wire ropes must be properly matched with each sheave.
- End fittings and connections consist of spliced eyes and various manufactured end fittings.

- All wire ropes and fittings should be visually inspected before each job.

- Stand clear of tools being hoisted.

Cementing/Grouting. Cement grout is used for the installation and abandonment of monitoring wells, production wells, and soil borings. Cement may be brought to a work site already mixed or mixed in tubs at the site, depending upon the quantities required. Caution must be taken when mixing mud to avoid getting dry or wet mix in the eyes or onto the skin.

- Fresh cement causes burns upon prolonged contact with the skin; wash it off.
- Approved dust respirators must be worn when hand mixing grout, dry mud or fillers.
- Goggles or full-face shield is required when hand mixing any materials such as caustics, or other materials that could cause eye burns or injury.
- All persons in the vicinity of the drill rig must wear safety glasses with side shields at all times.
- All grout hose line connections must be secured with positive interlocking devices when grouting is in progress, in order to prevent the hoses from whipping if they should break apart.
- Care must be taken by the rig operator and crew to ensure that cement is not squirted into the face and eyes of anyone when hose couplings are disconnected.
- Should a helper have to insert a hand or arm into the liquid cement mix in order to clean off the end of a suction hose, the mixer must be turned off and rubber gloves that extend far enough up the arm to prevent any contact of the cement with bare skin worn.
- Should anyone get cement in their eyes, they should flush their eyes with clean water for at least 15 minutes and then be taken for emergency treatment.

4.0 DECONTAMINATION

4.1 Heavy Equipment

- The Subcontractor will provide all tools, materials, and equipment necessary to construct a decontamination pad.

- The pad should be constructed in a manner that will permit all wash and rinse fluids to be contained and collected; heavy gauge plastic sheeting and sandbags can be used for this purpose, and a suction device used to collect liquids.

- A high pressure, high temperature "hotsy-type" device is typically used to wash down heavy equipment, augers, drill rods, drill bits, well screens and casings, as specified in the HSP and the Sampling and Analysis Plan (SAP).

- Ideally, the heavy equipment decon pad will be constructed adjacent to the exclusion or hot zone. Location of the decon pad should be discussed in the pre-work meeting, to verify logistical considerations such as water/utility supplies. A water truck may need to be provided by the Subcontractor, as indicated in the SOW.

- At drill sites where it is likely that the wheels and tracks of heavy equipment have contacted contaminated materials, they should be decontaminated upon leaving the exclusion zone. This is generally not necessary when drilling through concrete or other "clean pavement".

- Partial decontamination efforts can be conducted in the exclusion zone. As much mud, dirt, rocks, etc., as possible will be mechanically removed from the tires, tracks, or outside of the equipment.

- Following decontamination, the heavy equipment can be driven or transported into the support zone.

- Dirty/contaminated augers and tools transported by support equipment to the decon area must be placed on a heavy gauge plastic, to protect the truck bed and prevent cross-contamination with cleaned tools and equipment.

- Under no circumstances should heavy equipment be allowed to leave the site if it has not been decontaminated.

- Drill rods, augers, bits, well casings and other items must be steam cleaned in a designated decontamination area prior to placement in each borehole.

- All drill pipe and well casing will be covered with plastic prior to use.

4.2 Tools.

When all work activities have been completed, contaminated tools should be thoroughly decontaminated.

- It is expected that all tools will be constructed of non-porous, non-absorbent materials. This will aid the decontamination process.

- Any tool, or part of a tool, which is made of a porous/absorbent material should be discarded and disposed of as a hazardous waste if it cannot be properly decontaminated.

- Tools can be placed on a decontamination pad or into a bucket and thoroughly washed using a soap solution and brushing, followed by a fresh water rinse. All visible particles should be removed before the tool is considered clean.

- Those tools which would be damaged by high pressure spray can be cleaned manually, using a soap solution and mechanical brush, followed by a fresh water rinse.

- Detergents and cleaners will be specified in the HSP; if not, then the OHSC must approve the substance for use, receive an MSDS, and incorporate the information into the Site Specific HSP. In general, biodegradable solutions are preferred.

4.3 Steam Cleaners

High pressure, high temperature steam cleaners are a standard requirement for equipment decontamination.

- The operator should direct the flow of steam away from other persons.

- Safety glasses with side shields must be worn by everyone involved with steaming operations. Faceshields and other splash protection may be specified in the Site Specific HSP.

- Hearing protection is required for those persons involved with steaming operations.

- Steam cleaners must have noise and temperature hazard warning labels.

- Steam cleaners must never be refueled while the engine and burner is running, or while hot enough to ignite fuel vapors.

4.4 Investigative-Derived Waste (IDW)

All discarded materials that accumulate from onsite activities (PPE, decon fluids, supplies, etc.) will be segregated by matrix and by source location; placed in labeled, DOT 17-H, 55-gallon drums; and be stored in a secure, designated location, protected from the elements.

- The Subcontractor will provide the drums, pallets, and drum moving equipment (such as a forklift) with a trained operator.

- Forklifts may not be borrowed from the client for Subcontractor's use.

- Forklifts may only be operated by adequately trained, experienced personnel.

- The Subcontractor may be asked, as per the SOW, to construct or prepare the IDW storage area, including the fence, tarping or roof, and fences with proper signs. The Project Manager will supply the Subcontractor with the Ogden IDW SOP, as necessary.

5.0 FIRE PREVENTION AND SAFETY

In addition to these listed below, other requirements may appear in the HSP as Ogden or Client required procedures.

5.1 Fire Extinguishers.

Approved fire extinguishers must be maintained in good condition on every rig; a 10-lb or 20-lb ABC rated extinguisher is acceptable. The extinguishers should be placed in a conspicuous and easily accessible location.

- The fire extinguisher must be maintained in a fully-charged condition at all times.

- Should the fire extinguisher become partially or completely discharged for any reason, it must be recharged or replaced with a fully-charged extinguisher.

- Extinguishers are to be inspected monthly and be maintained in accordance with manufacturer's specifications.

- A fire extinguisher must be present and readily accessible within 50 feet of any equipment is being refueled at the site.
- When welding equipment or a cutting torch is being used at a work site, the extinguisher must be located within 30 feet of any source of flame.

5.2 Flammables/Combustible Storage

Flammable and combustible liquids such as gasoline or diesel fuel may be brought onto a work site by either of two methods: 1) in bulk containers, or 2) in UL-approved safety containers.

- If flammable or combustible liquids are brought to the site in bulk containers, the container must be permanently mounted on the transporting vehicle. Fuel may <u>not</u> be transported in unsecured 55-gallon drums.

- Bulk containers must be clearly marked as to their contents, and show appropriate National Fire Protection Association (NFPA) and OSHA hazard warning labels.

- Bulk fuel delivery trucks must have a grounding wire, which is to be used whenever equipment is being refueled.

- Bulk flammable/combustible tanks must be stored > 100 ft. from the rig or other equipment with internal combustion engines.

- Flammable and combustible fuels may also be brought to the site in UL-approved 5-gallon metal cans. Such cans must have explosion resistant (flap-type) lids with spark arrestors, and must be clearly marked as to the contents.

- Approved containers of flammable/combustible fuels, solvents and lubricants must be stored in designated areas (not in the back of a pickup truck), at least 50 feet away from the drill rig and other ignition sources.

- The fuel storage area must be cordoned off, protected from the elements and be posted with a "No Smoking" sign. Containers of hydraulic oil, motor oil, and other combustible materials needed at a work site should also be stored at this location.

- The exhausts of equipment powered by internal combustion engines will be located well away from flammables and combustibles.

- Appropriate spill containment and response equipment shall be located in, or easily accessible to, any area where flammables are used or stored, including refueling.

5.3 Refueling

Do not refuel gasoline or diesel motors while in operation, or while hot enough to ignite highly volatile vapors.

- Turn off all electrical switches and the engine before refueling.

- Never completely fill portable containers (allow for expansion).

- Fuel nozzle must always stay in contact to prevent static spark.

- Bulk containers involved in fuel transfers should be grounded.

- Do not spill fuel on hot surfaces. Clean any spillage before starting engine.

- Use cotton rags only. Never use wool or metallic cloth due to static spark.

- Refuel in a well-ventilated or open area.

5.4 Hot Work Permits and Approvals

Hot work permits must be secured from the OHSC for any welding or cutting performed in any zone onsite, an example of a permit is given as Attachment B-2. At some locations, hot work permits will have to be secured from the Activity or client. This should be discussed in the pre-work meeting with the client.

- No open flames are allowed in the work zones other than permitted welding and cutting.

- A smoking area will be designated in the support (non-work) zone, away from flammables and combustibles.

- A "fire-watch" or "buddy" must be a designated while welding/cutting operations are being conducted.

- A hot work permit must specify:
  - date and the length of time the permit is valid;
  - type of operation;
  - flammable/combustibles storage distance requirements;
  - type and size of fire extinguisher;
  - atmospheric monitoring requirements;
  - name of designated fire-watch;
  - signature/approval block of competent individual securing the permit.

5.5 Oxygen/Acetylene Compressed Gas Cylinders

An oxygen/acetylene compressed gas cylinder may be brought onsite for cutting and welding but requires a hot work permit and approvals. Safety measures associated with these gas cylinders include:

- Cylinders of oxygen and acetylene are to be secured from falling or rolling during transport to the site. Vehicles must show appropriate DOT placards.

- When left at the work site, oxygen and acetylene cylinders must be stored in an upright position and secured with a rope or chain to a rigid support. These bottles must be <u>secured from falling at all times, including when they are in use</u>.

- While onsite, oxygen and acetylene cylinders must have appropriate identification and hazard warning labels.

- If the pressure regulator and hoses are not attached to the cylinders, then the valve caps must be in place and screwed down all the way.

- If the regulators and hoses are attached to the bottles, but will not be used during the course of work that day, they must be removed and the bottle caps installed.

- Cylinder caps shall <u>always</u> be in place during transport.

- Any time an oxygen/acetylene torch is used to cut metal or used for any other purpose, a face shield and leather gloves with wrist and forearm protection must be worn by the person operating the torch.

- If other persons are required to be in the vicinity of the torch while metal is being cut, they should wear safety glasses with side shields and leather gloves, as necessary, to protect against burns.

- In the event that the Subcontractor is asked to provide a cylinder of hydrogen for operation of a Flame Ionization Detector (FID), e.g., OVA, then the same handling and storage apply, except the hydrogen must be secured upright in the safest place possible, like the office trailer or a separate, protected, cylinder storage area.

6.0 HAZARD COMMUNICATION

Hazard communication is an integral part of chemical safety. For projects of this scope, hazard communication can be roughly divided into two areas: 1) hazards associated with hazardous materials/substances brought onsite to implement site activities (regulated by OSHA 29 CFR 1910.1200 as the Hazard Communication Standard); and 2) hazards

associated with the chemicals of concern or study at the project site (regulated by OSHA 29 CFR 1910.120 as the HAZWOPER standard).

For this contract, the Subcontractor has key responsibilities for the Hazard Communication or "Right-to-Know" standard. Subcontractors are required to have a written Hazard Communication Program. Ogden has the lead responsibility for hazard and risk communication associated with the HAZWOPER standard.

6.1 MSDSs

Material Safety Data Sheets (MSDSs) provide information on the proper storage and handling procedures of hazardous materials brought to the site, as well as emergency information in case of accidental exposure or spill.

- MSDSs must be provided to the Ogden OHSC for <u>each</u> hazardous material or substance brought to the site. These include: fuels (gasoline, diesel No. 2, etc.); grouts, cements and dry fillers; compressed gas cylinders; silica sand; detergents; solvents; and others (pipe dope, drilling foam, etc.) as applicable.

- MSDSs must be filed onsite and be incorporated into the Site Specific HSP, these should be provided to the OHSC or FM during the pre-work meeting, as feasible.

- The Subcontractor is solely responsible for acquisition of MSDSs for all substances carried to the site by the Subcontractor, including contacting the vendor or supplier of materials if the MSDS is not onhand.

- Subcontractor employees should be trained on how to use MSDSs, and should know where the MSDSs are kept.

6.2 Labels

- Containers of hazardous materials should be clearly labeled as to their contents Original product containers usually provide this information, temporary or secondary storage containers (approved cans, squeeze bottles, etc.) must have this information added. Examples: approved fuel containers (bulk and 5-gallon metal); bottles of isopropyl alcohol, sulfuric acid, nitric acid, hydrochloric acid, etc. that are used as decon solutions or sample preservatives.

- All secondary squeeze, spray or squirt bottles must be labeled, even non-hazardous (de-ionized water) substances so that they are not accidentally misused, particularly in the equipment decontamination line.

- Hazardous materials containers may not be reused for human consumption, even after decontamination. Theses include drums, cans and bottles.

- OSHA labels do not apply to IDW drums, these are regulated by the EPA. Procedures are found in the Ogden IDW SOP, and will be discussed, as applicable, by the Project and/or Field Manager in the pre-work meeting or other forum.

6.3 Hazard Warning Signs

The Subcontractor is responsible for providing all necessary and appropriate hazard warning signs for all equipment or operations under their direction, including the following:

- Operations which pose fire hazards should be conspicuously marked: "No Smoking or Open Flames", or "No smoking or Open Flames Other than Permitted welding and cutting", as appropriate.

- Equipment posing noise hazards must be labeled as such, including drill rigs, heavy equipment, compressors, steam cleaners, certain tools, etc.

- Equipment and tools (including the derrick) posing electrical or electrocution hazards must be labeled as such.

- Factory designed machine/equipment guards should have labels that indicate the hazard (usually moving or rotating parts hazard), and also the prohibition of protective guard removal during operation.

- Operations or storage areas requiring restricted access must be suitably barricaded and signed.

- Other hazard warning labels/signs as described in the Site Specific HSP, or as required by the OHSC, FM, or Client.

6.4 Training/Orientation

- Thorough Hazard Communication or "Right-to-Know" training for hazard materials brought to and used in the workplace or worksite shall be the responsibility of respective employers in accordance with internal policies, procedures and written programs, as per the regulation.

- Certain "Right-to-Know" hazards may also be reviewed periodically in tailgate meetings as a reminder of safe work and emergency procedures, particularly after instances of improper use or handling onsite.

- Required initial classroom and onsite supervised HAZWOPER training is the responsibility of respective employers, including annual (within 12 months) updates. The Subcontractor's field supervisor or foreman should also receive an additional 8-hours of Supervisor Training in HAZWOPER.

- Hazard or risk communication for hazardous waste and substances that are being studied or characterized onsite is the responsibility of Ogden, and will be communicated to the Subcontractor in the following ways:

  - Presentation of the Site-Specific HSP to the Subcontractor upon award, of the subcontract, which the Subcontractor is expected to read and ask questions.

  - Orientation of the Site-Specific HSP in a pre-work or "kick-off" safety meeting, all Ogden and routine subcontracted field team members (drillers, heavy equipment operators, surveyors, etc.) will be required to sign the acceptance page of the Site-Specific HSP.

  - Daily tailgate safety meetings discussing the work tasks at hand and potential hazards; also reviewing any previous occurrences of unsafe acts.

  - Visitor and Subcontractor orientations for brief, non-routine site visits (repairman, electrician, welder, security, etc.) as applicable.

- Subcontractors are responsible for ensuring employees are aware of hazards associated with the tasks being performed. Employee awareness needs to be emphasized further during change of tasks and/or change of locations. Awareness should include methods/procedures to be used to prevent injury.

7.0 ACKNOWLEDGMENT OF RECEIPT

This completed acknowledgment must be submitted to the Purchasing Department with your proposal documents, in order to be considered for this contract award.

I, ________________________________(name) being an authorized agent for the ____________________________________(company), acknowledge receipt of this Safe Work Practices for Equipment Operators, and agree to abide by these and all other procedures required by the HSP or federal, state and local regulations, to the best of my ability, if awarded the contract described in this Request for Proposal (RFP).

________________________________ ________________________

Signature Date

DAILY DRILL RIG CHECKLIST

Date	______________	Rig Description	______________
Project #	______________	Serial or License #	______________
Location	______________	Rig Owner	______________

Item Name	Requirement	Yes	No*	Comment
Hydraulic systems controls and levers	No leaking fittings or connections. Levers are in good operating condition. Fluid levels are full.			
Fuel, oil, water, and coolant lines	No leaks.			
Hoses	No leaks in hoses or connections. No signs of excessive wear, kinked or bent hoses.			
Gauges	Operational and visible to operator.			
Emergency kill switch and life line	Operational and accessible to operator.			
Shear pins	In place.			
Drive chains	No signs of excessive wear, broken or defective links.			
Parking brakes	Set and operational.			
Outriggers	No leaks. Set on pads (as necessary to avoid damage).			
Windshield wipers	Operational.			
Lights (head, tail and running lights)	Operational and without cracked lenses.			
Back-up alarm	Operational, spotter used.			
Pulleys, drums and spools	No excessive wear or cracking.			
Derrick/Mast	Locked in position. Frame is not cracked or bent.			

DAILY DRILL RIG CHECKLIST (Continued)

Item Name	Requirement	Yes	No*	Comment
Cables and ropes	No fraying, bird nesting, flattening, stretching. Must be braided or properly clamped at connections.			
Hoists	Properly spooled cable, rated to lift loads.			
Safety equipment	Safety harness, fire extinguisher, flares, safety reflectors, first aid kit, grounding wire for fueling, and spill response equip-ment (for fueling & repairs).			
Guards	Power take-offs (PTOs) and all rotating parts designed with guards. Guards must have warning labels.			
Miscellaneous (as applicable)	Diverter systems; auger and head seals; cyclones; grout plant guards; etc. (list): • • •			

* Deficiencies (Explain all negative responses and list corrective actions; all deficiencies must be corrected before the rig is entered into service):

____

____

____

Other Repairs or Routine Maintenance: ______________________________

____

____

Inspection Conducted and
Rig Certified by:
(Owner/Operator) ______________________________
Name and Date

Report Reviewed by:
(Ogden OHSC or FM) ______________________________
Name and Date

HOT WORK
(FLAME OR SPARK PRODUCING ACTIVITIES)
PERMIT

NOTE: THIS PERMIT IS GOOD FOR ONLY 24HRS UNLESS PERMIT EXTENSION (BELOW) IS SIGNED

DATE: ______________________ No.:____________

START DATE:______________________ START TIME: ____________AM/PM
PERMISSION GIVEN TO:______________________________________
OF (CO.) ______________________________ GROUP:______________
JOB/LOCATION OF BOUNDARIES______________________________________

WORK DESCRIPTION______________________________________

EQUIPMENT TO BE USED______________________________________
____

VIOLATION OF ANY PERMIT REQUIREMENTS WILL BE CAUSE FOR DISCIPLINARY ACTION.

( ) if required or "N/R"	Initials	The Field Manager (FM) or Onsite Health and Safety Coordinator (OHSC) must check requirements below and initial after requirements have been met and **before this permit is valid.**
		Combustible gas test required initially . Time: ____________
		(Plus every __________hrs.)
		Continuous explosivity monitoring required at site.
		Safety observer (fire watch).
		Fireproof blanket.
		Fire extinguisher ______________ (type/size)
		Lines disconnected and blanked.
		Respiratory Protection:.__________________ (type)
		Vessels and/or area clean of oil/combustibles.
		Vehicle entry permit.
		Work to start only on FM/OHSC approval.
		Inert gas purge required.
		Confined space entry permit.
		Distance of operation from flammables/combustibles (including adjacent rooms)
		Lock out/tag out.
		Area to be roped off or otherwise isolated with "fire watch" present onsite for at least 30 minutes after task completion.
		Other special requirements

Permit Requested by:________________ CO.: ______________________________________

Necessary restrictions are specified and hot work may safely begin (OHSC/FM)______________________

HOT WORK WILL NOT BEGIN UNTIL REQUIREMENTS ARE MET, APPROVAL SIGNATURES ARE OBTAINED, AND PERMIT IS POSTED AT THE JOB SITE.

PERMIT EXTENSION

This permit has been extended for the period . __/__/__ from _____AM/PM to _____ AM/PM only:
Approved by (OHSC/FM)): ______________________________

INSTRUCTIONS FOR USE OF THIS PERMIT

This permit is to be used to control work which requires the use of sources of ignition within or near "the exclusion zone" by Company or Contractor personnel. Examples are:

1. Welding, burning, cutting or soldering.
2. Sparks from power tools.
3. Electrical equipment not approved for hazardous areas.
4. Explosives, chemical fire hazards.
5. Motorized equipment used in exclusion zone.

Process, then post this permit at job site before work starts. If area becomes unsafe or permit conditions are not being met, anyone may pull the permit, stop all work, and notify the FM or OHSC.

CONTRACTOR MUST:

1. Initiate permit, ensure that job is well defined, justifiable and can be done safely.
2. Fill in the upper section then SIGN "requested by".
3. Review permit with FM the day before work is to be done. Give operations extra lead time if fire watch/standby manpower is required.
4. Ensure that craftsmen understand job boundaries, work precautions, restrictions and conditions.
5. Prepare job site for work. Have required materials ready.

OHSC or FM MUST:

1. Review permit with initiator to ensure work is defined, justifiable and can be done safely. Advise Activity Rep., as required, of any unusual hot work planned.
2. Specify "Restrictions Required" via checks in boxes provided, non applicable restrictions must be labeled as N/A.
3. Arrange for fire watch/safety observer if required.
4. Sign: "approved by" and date on line provided.
5. Ensure administrative training requirements have been met.

THE CRAFTSMAN MUST:

1. Be aware of all permit restrictions.
2. Report to the OHSC or FM before starting work, when leaving job site, and before resuming work.
3. Shut down machines, power tools, welding rigs, etc., when leaving job site.
4. Keep work area clean.

O H S C   *Onsite Health & Safety Coordinator*
F M   *Field Manager*
C O   *Contractor or Company*

MACHINERY & MECHANIZED EQUIPMENT CERTIFICATION FORM

From: **Ogden Environmental and Energy Services**
To: **Contracting Officer**
Ref: **(a) Contract , ANGRC, PROJECT No. ____**

1. This provides certification of machinery and mechanized equipment to be used on the referenced contract project number for the following work:

Description of equipment work:

Project Site:

Sub-contractor providing equipment:

Dates (duration) of equipment work:

2. Inspection and certification of machinery and mechanized equipment, as required by U.S. Army Corps of Engineers, EM 385-1-1, "Safety and Health Requirements Manual" has been made prior to and within seven calendar days of use on the project site. Re-certification will be required for equipment that is used on the project site for more than one year.

	Identification of equipment (make, model, serial no.)	Date of Certification
1		
2		
3		
4		

3. The above listed equipment has been inspected and tested as indicated above, and is CERTIFIED TO BE IN SAFE OPERATING CONDITION BY THE FOLLOWING COMPETENT MECHANIC:

Name

Title

Firm

Signature

4. If there are any questions on this certification, please contact the following Ogden representative:____________________________________

APPENDIX 5

TRENCHING AND EXCAVATION

SAFETY GUIDELINES

APPENDIX 5

TRENCHING AND EXCAVATION SAFETY GUIDELINES

Trenching and excavation work presents serious risks to all workers involved. A significant risk, and one of primary concern, is that of cave-in. Because of their inherent dangers, entry into trenches and excavations shall not be performed if there are means, other than entry (i.e., backhoe buckets, hand augers, shovels, or equivalent), to perform the work. Where entry into trenches and excavations is necessary, strict adhereance to the procedures specified below is extremely important and will prevent or greatly reduce the risk of cave-ins as well as other excavation-related accidents. Whenever there are questions regarding the safety of trench excavation entry, contact the OHSC or the Ogden HSM immediately. If entry into a trench or excavation >4 feet deep is necessary, the following guidelines must be followed:

<u>Sloping and Shoring</u>

In all excavations with possible cave-ins, employees must be protected by sloping, or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area as set forth in 29 CFR 1926.652 - Requirements for Protective Systems. The maximum allowable slope is 1.5:1 (H:V) or 34° as measured from the horizon. Provisions shall be made by the subcontractor to prevent injury to employees engaged in the installation of shoring for excavations. No part of the established shoring system of any excavation shall be removed until effective means have been taken to avoid hazards to employees from moving ground.

Use of portable trench boxes, sliding trench boxes, and/or shields in lieu of required sloping, benching, or supporting methods can be authorized when:

- The boxes and/or shields are designed by a competent professional engineer and provide equivalent protection to shoring and sheering for the same condition;
- The boxes and/or shields are constructed and maintained to design standards; and
- Backhoes and/or excavators used to move trench boxes and/or shields meet the applicable requirements of ANSI B30.5 and PCSA Standard No. 4.

Daily inspections of the excavation and adjacent areas will be conducted by a competent person prior to the start of work or as needed throughout the shift.

Materials and Equipment

Materials and equipment must be free from damage and defects to avoid failure of a protective system which may cause excavation hazards. Daily equipment checks and needed maintenance must be performed by a competent person.

Falls and Equipment

In addition to cave-in hazards and secondary hazards related to cave-ins, there are other hazards from which workers must be protected during excavation-related work. These hazards include exposure to falls, falling loads, and mobile equipment. To protect employees from these hazards, OSHA requires the employer to take the following precautions:

- Keep materials or equipment that might fall or roll into an excavation at least two feet from the edge of excavations, or have retaining devices, or both;
- Provide warning systems such as barricades, flags, hand or mechanical signals, or stop logs, to alert mobile equipment operators of the edge of an excavation that may not be in direct view;
- Provide scaling to remove loose rock or soil or install protective barricades and other equivalent protection to protect employees against falling rock, soil, or materials;
- Prohibit employees from working on faces of sloped or benched excavations at levels above other employees unless employees at lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment; and
- Prohibit employees under loads that are handled by lifting or digging equipment. To avoid being struck by any spillage or falling materials, require employees to stand away from vehicles being loaded or unloaded. If cabs of vehicles provide adequate protection from falling loads during loading and unloading operations, the operators may remain in them.

Water Accumulation

Employees are prohibited from working in excavations where water mass accumulates without adequate protection. When the excavation reaches the groundwater table, dewatering procedures will be initiated. Water removal equipment and the operations of the equipment must be monitored by a competent person to ensure safe, proper use. If a portable generator is used, it must be grounded.

The excavation should be carefully inspected after every rainstorm or other hazard-increasing occurrence by a competent person. The protection against slides and cave-ins shall be increased, if necessary, before employees are permitted to enter the excavation.

Hazardous Atmospheres

Excavations greater than four feet in depth where oxygen deficiency or hazardous atmospheres may exist, must be tested prior to entry. Excavations with underground fuel gas lines must be monitored also. Engineering controls such as blowers may be used to reduce hazardous atmospheric conditions. Air purifying and air supplying respirators should be on-hand if needed as well as emergency and rescue equipment. Atmospheric monitoring of hazardous atmospheres in excavations shall be conducted as often as necessary by the OHSC to ensure that the atmosphere remains safe and hazard control measures used are effective. See also Confined Space Entry Procedures for emergency response and excavation monitoring.

Access and Egress

Safe access and egress to the excavation must be provided. Ladders, steps, ramps or other safe means of egress must be available within 25 feet of lateral travel and the siderails should extend 3 feet above the landing. Ladders used onsite must be in good working order and meet OSHA requirements.

Competent Person Responsibilities

Responsibilities required of the competent person performing excavation activities include:

- Checking, before digging, for existing underground installations within work area;
- Checking for hazardous atmospheres and taking proper personnel safety measures if they are found;
- Making sure the protective system used is properly employed in the work area;
- Making certain that employees are wearing proper protective gear;
- Making the work area safe from vehicular and pedestrian traffic;
- Properly employing means of access and egress from the excavation;
- When using manufactures tabulated data, make certain it is accessible at the jobsite;
- Making sure the protective system employed is in good working condition;
- Making sure that the open excavation is properly covered at the end of a work day, when further work is required the next day or shift; and

- Making sure personnel are removed from the excavation if a potentially hazardous condition is recognized.

SECTION II
HEALTH AND SAFETY PROCEDURES

Approved/Date

ACCIDENT REPORTING

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

The purpose of HSP-1 is to communicate procedures to all ANGRC IRP personnel for use in accident reporting. Additional purposes are:

1. To let the supervisor know something went wrong in the performance of a job.
2. To assure proper medical attention is provided.
3. To provide data for study and future accident prevention.
4. To comply with occupational regulations.
5. To provide information for the involved insurance companies and other agencies.

2.0 SCOPE

This procedure should be followed any time an accident occurs during performance of project site work.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

None.

4.0 RESPONSIBILITIES

Field personnel are responsible for immediately reporting accidents to the Field Program Manager (FM).

The FM is responsible for reporting the accident to the Project Manager.

The Project Manager is responsible for reporting the accident to the ANGRC Health and Safety Program Manager (HSPM) within 24 hours of occurrence.

The Onsite Health and Safety Coordinator (OHSC) reports jointly to the HSPM and FM and is responsible for supervising and directing all project health and safety activities.

5.0 PROCEDURES

5.1 EMPLOYEE INJURIES

1. All injuries will be reported to the FM.

2. The FM will take steps necessary to obtain first aid attention for the injured employee.

3. The FM or Project Manager will prepare and complete "Supervisor's Report of Accident" - Attachment 1, and if the situation warrants, the applicable state form for the "Employer's Report of Occupational Injury or Illness" - Attachment 2. These forms are attached to the site Health and Safety Plan. These reports should be submitted to the HSPM when complete, within 24 hours.

5.2 Fires

1. In the event that an Ogden employee uses a fire extinguisher, even briefly, this must be reported to the Onsite Health and Safety Officer or FM.

2. All fires will be reported to the immediate supervisor, FM, or the Project Manager.

5.3 Vehicle Accidents

1. The driver's FM or Project Manager will be informed of any accident involving a vehicle.

2. The FM or Project Manager will complete "Supervisor's Report of Accident" - Attachment 1, and if the situation warrants, the applicable state form for the "Employer's Report of Occupational Injury or Illness" - Attachment 2. Human Resources has these forms and will assist with their preparation and completion. These reports should be submitted to Human Resources when complete.

3. The driver or witness will provide sufficient information at the time of the accident to permit the FM or Project Manager to complete all forms required by the regulatory agencies and insurance carriers.

5.4 Other Accidents

1. Any other unplanned, unwanted occurrence (i.e., explosions, splashes, spills, etc.) will be reported to the FM or Project Manager.

5.5 Supervisor Responsibilities

5.5.1 Why a Supervisor Should Make A Personal Investigation of All Accidents

1. An investigation is the best way of assuring that the supervisor finds the true cause of an accident.

2. The supervisor knows or should have known what the employee should have been doing, the proper way to do it, and what the employee probably did or did not do.

3. The supervisor is best qualified to evaluate the information gathered and conclude what specifically caused the accident.

4. The supervisor has the authority and responsibility to investigate and determine the facts and to initiate the corrective action needed.

5.5.2 Legal Responsibilities

1. Occupational Safety and Health Act (OSHA) regulations require that in every case involving a death, serious injury or illness, a report must be made immediately by the employer to the nearest District Office of the Occupational Safety and Health Administration.

2. OSHA regulations also require that an employer report within 5 days every industrial injury or occupational disease which: a) results in lost time beyond the day of injury, or b) requires medical treatment other than first aid. The "Employer's Report of Occupational Injury or Illness" completed by the supervisor and submitted to the Ogden insurance carrier satisfies this aspect of the reporting requirement.

3. Under Worker's Compensation Laws the "Employer's Report of Occupational Injury or Illness" must be submitted to the Ogden insurance carrier for every injury or illness arising out of or in the course of employment.

5.5.3 Investigation Reporting

1. The supervisor shall:

   a. Conduct an investigation of all accidents and work related illnesses. Talk with the victim, co-workers who witnessed the accident or condition, and examine the doctor's medical report if available.

   b. Prepare and complete the "Supervisor's Report of Accident, Attachment 1, and if the situation warrants, the Employer's Report of Occupational Injury or Illness, Attachment 2. Ogden Human Resources has these forms and will assist with their preparation and completion. Human Resources will determine if the injury or illness is considered reportable and would therefore warrant the completion of the Employer's Report of Occupational Injury or Illness. These reports serve as a record of the facts. They must be completed within 24 hours after an accident or the development of an occupational illness.

   c. Submit the report(s) to the Health and Safety Program Manager, who will forward to Human Resources. Human Resources requires the report(s) for record keeping and reporting purposes.

   d. Follow up on the corrective action measures previously outlined in the "Supervisor's Report of Accident." This is an important preventive step to eliminate future accidents or illnesses.

6.0 RECORDS

The accident report should be transmitted to the HSPM, Human Resources, the ANGRC IRP Program Manager, and the Project Manager.

7.0 REFERENCES

Fed OSHA: 29CFR1904, Recording and Reporting Occupational Injuries and Illnesses

Call OSHA: Title 8, Section 3203 Injury and Illness Prevention Program

8.0 ATTACHMENTS

1. Supervisor's Report of Accident
2. Employer's Report of Occupational Injury or Illness

Cal OSHA: Title 8, Section 3203 Injury and Illness Prevention Program

SUPERVISOR'S REPORT OF ACCIDENT

NOTE In order to prevent accidents, it is necessary to know how and why they occur. State facts as accurately as possible.. Accurate reporting of all facts will help in the preparation of the "Employer's Report." Submit your complete report within 24 hours. If additional space is needed, use reverse side.

Name of Injured Employee		Department in Which Regularly Employed
Injury Date	Time a.m. p.m.	Date Employer was Notified of Injury
Did Accident Occur on Employer's Premises? ☐ Yes ☐ No	Where? (Specify dept., job site, etc.)	Name of witnesses.

What was employee doing when injured? (Such as: walking, lifting, operating machines, etc.; Be specific

Please describe fully the events that resulted in injury or occupational disease. Tell what happened and how it happened? (Do not describe nature of injury.)

What machine, tool, substance or object was most closely connected with the injury? (e.g., the machine employee struck against or which struck him; the chemical that irritated his skin; in cases of strain, the thing he was lifting, pulling, etc.)

Nature of injury and part of body affected.

CAUSES OF ACCIDENT: CHECK ALL THAT APPLY

UNSAFE BUILDING OR WORKING CONDITIONS

- ☐ LAYOUT OF OPERATIONS
- ☐ LAYOUT OF MACHINERY
- ☐ UNSAFE PROCESSES
- ☐ IMPROPER VENTILATION
- ☐ IMPROPER SANITATION/HYGIENE
- ☐ IMPROPER LIGHT
- ☐ EXCESSIVE NOISE
- ☐ FLOORS OR PLATFORMS
- ☐ MISCELLANEOUS

HOUSEKEEPING

- ☐ IMPROPERLY PILED OR STORED MATERIAL
- ☐ CONGESTION

PHYSICAL HAZARDS OR EQUIPMENT

- ☐ INEFFECTIVELY GUARDED
- ☐ UNGUARDED
- ☐ GUARD REMOVED
- ☐ DEFECTIVE TOOLS
- ☐ DEFECTIVE MACHINES
- ☐ DEFECTIVE MATERIALS

INSTRUCTIONS AND TRAINING

- ☐ NONE
- ☐ INCOMPLETE
- ☐ ERRONEOUS
- ☐ NOT FOLLOWING INSTRUCTIONS
- ☐ OPERATING WITHOUT AUTHORITY
- ☐ WORKING AT UNSAFE SPEED
- ☐ INEXPERIENCE
- ☐ UNTRAINED IN PROCEDURE
- ☐ INCORRECT USE OF TOOL OR EQUIPMENT
- ☐ IMPROPER JUDGMENT
- ☐ IMPROPER LIFTING
- ☐ LIFTING EXCESSIVE WEIGHT

DISCIPLINE

- ☐ NOT FOLLOWING SAFETY RULES
- ☐ HORSEPLAY

APPAREL OR PERSONAL PROTECTIVE EQUIPMENT

- ☐ PROTECTIVE EQUIPMENT NOT USED
- ☐ UNSUITABLE PROTECTIVE EQUIPMENT
- ☐ UNSUITABLE CLOTHING OR FOOTWEAR

What can be done to prevent such an accident from happening again?

Approx. date condition will be corrected?	Signature of Supervisor:	Date:

PLEASE TYPE ALL INFORMATION, IF POSSIBLE

State of California
EMPLOYER'S REPORT
OF OCCUPATIONAL
INJURY OR ILLNESS

Please complete in triplicate. Retain one copy for your files and mail the original and one copy to
ALEXSIS RISK MANAGEMENT SERVICES INC.
Two Embarcadero Center, Suite 1270
San Francisco, California 94111
Telephone: 415/765-1900
(ORIGINAL COPY MUST BE SUBMITTED TO THE STATE)

OSHA-Case
or File No.

PICA ELITE ← TYPEWRITER ALIGNMENT GUIDE → PICA ELITE

California law requires an employer to report within five days every industrial injury or occupational disease which: (a) Results in lost time beyond the day of injury or (b) requires medical treatment other than first aid. PLEASE NOTE: In addition, if death results or if the injury or illness: (a) Requires inpatient hospitalization of more than 24 hours for other than medical observation; or (b) results in loss of any member of the body; or (c) produces any serious degree of permanent disfigurement, then the nearest district office of the California Division of Occupational Safety and Health also must be notified immediately by telephone or telegraph. This notification is not required, however, if the injury or death results from an accident on a public street or highway.

EMPLOYER

1. FIRM NAME — 1A. POLICY NUMBER
2. MAILING ADDRESS (Number and Street, City, ZIP) — 2A. PHONE NUMBER
3. LOCATION, IF DIFFERENT FROM MAIL ADDRESS (Number and Street, City, ZIP) — 3A. LOCATION CODE
4A. NATURE OF BUSINESS e.g., painting contractor, wholesale grocer, sawmill, hotel, etc. — 5. STATE UNEMPLOYMENT INSURANCE ACCT. NO.
4B. TYPE OF EMPLOYER: PRIVATE STATE CITY COUNTY SCHOOL DISTRICT OTHER GOVERNMENT—SPECIFY

EMPLOYEE

6. EMPLOYEE NAME — 7. DATE OF BIRTH (MM-DD-YY)
8. HOME ADDRESS (Number and Street, City, ZIP) — 8A. PHONE NUMBER
9. SEX Male Female — 10. OCCUPATION (Regular job title, not specific activity at time of injury) — 11. SOCIAL SECURITY NUMBER
12. DEPARTMENT IN WHICH REGULARLY EMPLOYED — 12A. DATE OF HIRE (MM-DD-YY)
13. HOURS USUALLY WORKED HOURS PER DAY — 13A. DAYS PER WEEK — 13B. TOTAL WEEKLY HOURS — 13C. Under what class code of your policy were wages assigned?
14. GROSS WAGES SALARY PER HOUR DAY WEEK TWO WEEKS MONTH OTHER—SPECIFY

INJURY OR ILLNESS

15. WHERE DID ACCIDENT OR EXPOSURE OCCUR? (Number and Street, City) — 15A. COUNTY — 15B. ON EMPLOYER'S PREMISES? YES NO
16. WHAT WAS EMPLOYEE DOING WHEN INJURED? (Please be specific. Identify tools, equipment or material the employee was using.)
17. HOW DID THE ACCIDENT OR EXPOSURE OCCUR? (Please describe fully the events that resulted in injury or occupational disease. Tell what happened and how it happened. Please use separate sheet if necessary.)
18. OBJECT OR SUBSTANCE THAT DIRECTLY INJURED EMPLOYEE e.g. the machine employee struck against or which struck him; the vapor or poison inhaled or swallowed; the chemical that irritated his skin; in cases of strains, the thing he was lifting, pushing, etc.
19A. DESCRIBE THE INJURY OR ILLNESS e.g. cut, strain, fracture, skin rash, etc. — 19B. PART OF BODY AFFECTED e.g. back, left wrist, right eye, etc.
20. NAME AND ADDRESS OF PHYSICIAN (Number and Street, City, ZIP)
21. IF HOSPITALIZED, NAME AND ADDRESS OF HOSPITAL (Number and Street, City, ZIP)
22. DATE OF INJURY OR ILLNESS (MM-DD-YY) — 23. TIME OF DAY a.m. p.m. — 24. Did employee lose at least one full day's work after the injury? (MM-DD-YY) NO YES—Date Last Worked:
25. HAS EMPLOYEE RETURNED TO WORK? MM-DD-YY — 26. DID EMPLOYEE DIE? (MM-DD-YY) NO YES—Date of Death
27. WAS EMPLOYEE ... OFFICER, PARTNER OR ... YES NO — 29. IS EMPLOYMENT: PERM TEMP PART TIME SEAS

Completed by (type or print) — Signature — Title — Date

FORM 5020 (REV. ...)

FILING OF THIS REPORT IS NOT AN ADMISSION OF LIABILITY

PLEASE DO NOT USE THIS COLUMN: CASE NO. / OWNERSHIP / INDUSTRY / OCCUPATION / SEX / AGE / DAILY HOURS / DAYS PER WEEK / WEEKLY HOURS / WEEKLY WAGE / COUNTY / NATURE OF INJURY / PART OF BODY / SOURCE / ACCIDENT TYPE / A.O.S. / EXTENT OF INJURY / CODED BY

CONFINED SPACE ENTRY

Approved/Date

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

The purpose of HSP-2 is to provide ANGRC IRP personnel with procedures for confined space entry.

2.0 SCOPE

This procedure applies to all members of ANGRC IRP field teams with at least one member participating in confined space entry. It is the objective of Ogden to provide a safe and healthy environment for all of our employees through the prevention of occupational injuries and illnesses. This objective will be carried out in accordance with accepted industry standards and applicable legal contractual requirements for occupational safety, health and medical practices. Consistent with this objective, this procedure has been developed and will be coordinated by the Ogden Corporate Health and Safety Officer and each designated Onsite Health and Safety Officer.

This procedure has been developed to serve as mangement-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

3.1 Authorized Attendant

An individual stationed outside the confined space who is trained to monitor and provide support as required to the authorized entrants inside the permit-required confined space.

3.2 Authorized Entrant

An employee who is properly trained and is authorized by the employer to enter a permit required confined space.

3.3 Blanking/Blinding

The absolute closure of a pipe, line, or duct by inserting and securing a barrier to withstand and prevent leakage of a material into a confined space.

3.4 Confined Space

An enclosed area that has the following characteristics:

- has restricted air flow,
- its primary function is something other than human occupancy,
- has restricted entry and exit,
- may contain potential or known hazards.

3.5 Double Block and Bleed

A method used in closing off a section of a line, duct or pipe between two locked-closed valves. The confined space between is then opened to the atmosphere by a vent.

3.6 ENGULFMENT

The surrounding and capture of a person by liquid or finely divided particulate matter.

3.7 ENTRY PERMIT

A written or printed document established by the employer which contains the information obtained from the employer's hazard identification and evaluation for that confined space.

3.8 HAZARDOUS ATMOSPHERE

An atmosphere that may be, or is injurious to occupants by reason of: oxygen deficiency or enrichment; flammability or explosivity; or toxicity.

3.9 HOT WORK

Work performed within a confined space that produces arcs, sparks, flames, heat, or other sources of ignition.

3.10 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH)

Any condition which poses an immediate threat of loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage, irritation or other conditions which could impair escape from the confined space.

3.11 ISOLATION

A process of physically interrupting pipes, lines, and energy sources which could be a serious hazard for confined space entrants.

3.12 LOCKOUT/TAG OUT

The placement of a lock/tag on the energy isolating device in accordance with an established procedure, indicating that the energy isolating device will not be operated until removal of the lock/tag in accordance with an established procedure.

3.13 PEL

An acronym for "Permissible Exposure Limit" which is the allowable air contaminant level established by the U.S. Department of Labor, Occupational Safety and Health Administration.

3.14 PURGING

The method by which gases, vapors, or other airborne impurities are displaced from a confined space. This may involve such measures as mechanical ventilation, steam ventilation, or introducing another gas such as nitrogen or carbon dioxide to render flammable vapors inert.

3.15 RETRIEVAL LINE

A line or rope secured at one end to a worker's safety belt, chest, body harness, or wristlets with the other end secured to an anchor point or lifting device located outside the entrance of the confined space. Retrieval lines must be of sufficient strength to remove an entrant when necessary.

3.16 WINCH

A retrieval device to assist in removal of personnel from a confined space. Only manually operated winches are permissible.

4.0 RESPONSIBILITIES

4.1 HEALTH AND SAFETY PROGRAM MANAGER (HSPM)

The Health and Safety Program Manager (HSPM) has general authority for the confined space entry program, and is responsible for ensuring the program is in compliance with OSHA regulations and ANGRC IRP Guidelines.

4.2 SITE HEALTH AND SAFETY OFFICER (SHSO)

The Onsite Health and Safety Coordinator (OHSC) serves as primary coordinator for all activities which involve work in, about, and in connection with confined space.

4.3 PROJECT MANAGER (PM)

Project Managers (PMs) are responsible for:

- Enforcing the confined space procedures;
- Completing a confined space entry permit and ensuring it is authorized by the OHSC, or designated supervisor;
- Ensuring confined space entry permits are posted and that a confined space attendant is present during all entry activities;
- Ensuring that all personnel have received proper training in confined space entry procedures and proper use of safety retrieval and emergency equipment;
- Ensuring that all necessary safety retrieval equipment for confined spaces is onsite, operational, and properly used;
- Ensuring site is properly posted and flagged.

4.4 AUTHORIZED ATTENDANT

Attendant Requirements - The attendant is to be stationed outside the confined space and monitor the confined space entrance, allowing only authorized personnel entry. In addition, the attendant will assure that the number of authorized personnel in the controlled area does not exceed the number specified in the confined spaced entry permit.

Duties of the Attendant - Attendants shall have the following duties:

- Remain in constant two-way communication with occupants either by signalling, visual contact, or verbal radio communication;
- Provide standby assistance to occupants exiting or entering the confined space;
- Direct occupants to exit the confined spaced when conditions arise that may be hazardous or IDLH;
- Initiate evacuation and emergency procedures;
- Monitor for conditions that could adversely effect the ingress or egress of the confined space;
- Warn unauthorized persons to stay away from or out of confined space, and inform authorized entrants and supervisor if an unauthorized person enters confined space;
- Remain at the entry point unless relieved by another authorized attendant.

5.0 PROCEDURE

5.1 CONFINED SPACE ANALYSIS

Before entry of personnel into a possible confined space, a survey of the premises and job task must be performed for identification of chemical and physical hazards. After identification, hazards will be evaluated by a health and safety specialist.

5.1.1 Hazard Identification

Hazard identification shall include, but not be limited to, a review of the following:

- Possible oxygen deficient/enriched, toxic, or flammable atmospheres;
- Possible physical, mechanical, or biological hazards;
- The possibility of liquids, gases, or solids being admitted during occupancy;
- Past and current uses of the confined space which may adversely affect the atmosphere of the confined space;
- Physical characteristics, configuration, and location of the confined space.

5.1.2 Hazard Evaluation

Each hazard will be evaluated with respect to:

- Scope of Hazard Exposure - consideration should be given to how many and/or which employees are exposed or may be affected.

- Magnitude of the Hazard - consideration should be given to how much energy may be released, how toxic are the chemicals, and the quantity of materials which could be inadvertently introduced, etc.

- Likelihood of Hazard Occurrence - consideration should be given to the range of probability for the hazard to occur, i.e., certain to impossible.

- Consequences of the Hazard Occurrence - consideration should be given to the most likely outcome if the hazard occurs, i.e., space explosion, death by asphyxiation, etc.

- Potential for Changing Conditions/Activities - consideration should be given to the possible introduction of hazards not previously identified, i.e., the filling of an adjacent tank in an adjacent space, etc.

- Strategies for Controlling the Hazards - Control strategies, such as forced ventilation, use of personnel protective equipment, space monitoring, and isolation should be formulated to control the hazard.

- Emergency Response - If the confined space atmosphere becomes unacceptable while work is in progress, procedures and equipment shall be provided to allow the employee to safely exit the confined space.

5.1.3 High Hazard Confined Space

A confined space is considered high hazard when it exposes occupants to a risk of death, incapacitation, injury or acute illness from one or more of the following:

- Atmospheric oxygen concentration below 19.5% or above 22%,

- Flammable atmosphere greater than 10% of Lower Explosive Limit (LEL),

- Atmospheric concentration of any toxic substance above the permissible exposure limit (PEL),

- Any atmospheric or physical condition recognized as IDLH.

5.1.4 Low Hazard Confined Space

A confined space is considered low hazard when there is an extremely low likelihood that an IDLH or engulfment hazard could be present, and when all other serious hazards have been controlled.

5.2 ATMOSPHERIC TESTING

5.2.1 Requirements of Atmospheric Testing

Before entry into a confined space, testing shall be conducted for hazardous atmospheres by a health and safety specialist. The testing sequence should be oxygen, flammability and toxicity. Preliminary tests shall be conducted prior to and after ventilation is turned on. During occupancy, the frequency of testing shall be set forth in the confined space entry permit. Test equipment to be used for each agent shall be listed on the confined space entry permit. The confined space entry permit is provided as Attachment 1.

5.2.2 Testing Considerations

Testing of confined spaces shall be conducted throughout the entire portion of the space to be occupied. Spaces which are deep, have odd shapes, or that are in remote areas may require that a probe or extension be added to the sampling equipment or that testing personnel take sampling equipment into the confined space to perform tests. Proper personal protective equipment (PPE) should be worn which addresses the hazards which may be encountered during testing. In addition, for horizontal travel inside a confined space, entrants shall wear a personal LEL/O_2 meter and an emergency escape air pack.

5.2.3 Acceptable Limits

The atmosphere of the confined space shall be considered within acceptable limits whenever the following conditions are maintained:

- Oxygen - 19.5% to 22%,
- Flammability - less than 10% of the Lower Explosive Limit (LEL), and
- Toxicity - Concentrations less than one-half of the PEL.

5.2.4 Change In Ambient Conditions (Odors, Weather, Etc.)

The introduction of chemicals into or adjacent to a confined space or the evacuation of chemicals from a confined space for more than 30 minutes shall require re-testing of atmospheric conditions.

5.3 Hazard Removal

5.3.1 Isolation

A confined space shall be isolated to prevent entry of materials and hazardous contaminants by:

- Blanking or blinding of pipes, lines, or ducts;
- Removal or misalignment of pipe, line, or duct sections;
- Double block and bleed of pipes, lines, or ducts; and
- De-energizing and lockout/tagout of external energy sources.

5.3.2 Ventilation

Before employees are permitted to enter a confined space, the space shall be mechanically ventilated if deemed necessary by the OHSC. Ventilation normally consists of a pre-entry purge of several air changes, then continuous introduction of fresh air during occupancy.

Ventilation shall be maintained during the occupancy if there is a potential for the atmospheric conditions of the confined space moving out of the acceptable range. When necessary, the confined space shall be mechanically ventilated to prevent accumulation of:

- Oxygen deficient or enriched atmospheres,
- Flammables in the atmosphere at concentrations above 10% of the LEL, and
- Toxic contaminants in the atmosphere above the PEL.

If the confined space is ventilated with an electrical air blower, it shall be used with a ground-fault circuit interrupter (GFCI).

Natural ventilation may be acceptable if it can achieve the same results as mechanical ventilation.

5.4 SAFEGUARDS

5.4.1 Entry and Exit

Each entry and exit point shall be evaluated to determine the most effective methods and equipment to be utilized that will enable employees to safely enter and exit the confined space.

All entry points to any confined space shall be posted. Barricades or caution flagging should be used in addition to posting of signs. Signs shall include but not necessarily be limited to the following information:

DANGER
CONFINED SPACE
ENTER BY PERMIT ONLY

5.4.2 Retrieval Equipment

Appropriate retrieval equipment or methods shall be used whenever a person enters a confined space.

Only manually operated winches shall be used to retrieve personnel from vertical depths of greater than eight feet.

All authorized entrants shall wear a safety belt, chest or body harness, or wristlets secured to a lifeline when entering a confined space.

5.4.3 Electrical Equipment

Electrical equipment used in hazardous locations shall meet the appropriate requirements of Article 500 of the National Electrical Code (NFPA-70).

To eliminate the potential for electrical shock, appropriate electrical equipment or systems shall be used. This would include protection such as GFCIs, assured grounding systems, double insulated tools, separately derived systems, and low voltage systems.

When temporary lighting is used in confined spaces, the following requirements shall be met:

- All lighting shall be "spark proof" approved for use in Class I, Division I, Groups A, B, C, and D atmospheres;

- Extension cords used for temporary lighting or other electrical equipment shall be equipped with connectors or switches approved for hazardous locations;

- Temporary lighting shall be equipped with adequate guards to prevent accidental contact with bulbs;

- Electrical cords shall be kept clear of working spaces and walkways or other locations in which they may be exposed to damage and present safety hazards such as tripping, etc.; and

- Temporary lighting and electrical cords shall be inspected regularly for signs of damage to insulation and wiring.

5.4.4 Compressed Gas/Flame Producing Equipment

Cylinders of compressed gas of any type will not be taken into confined spaces. Self-contained breathing apparatus (SCBA) equipment is the only exception.

Welding equipment is not to be used in confined space containing or potentially containing flammable gases, vapors, combustible dusts, or combustible materials.

Confined space entrants are not to carry matches or cigarette lighters into spaces containing or potentially containing flammable atmospheres.

When work activities (i.e., painting, decontamination with solvents, etc.) create a flammable atmosphere inside a confined space, the space shall be properly ventilated and continuously monitored during occupancy.

5.5 Emergency Response

5.5.1 Evacuation

Under the following circumstances, the authorized attendant shall call authorized entrants out of the confined space:

- If the attendant has to leave for any reason,
- If an emergency signal or alarm is sounded,
- If the attendant detects or suspects the presence of any harmful substance,
- If the attendant detects or suspects a breakdown in communication with the entrants.

5.5.2 Emergency Rescue

The authorized attendant shall initiate the following when rescue becomes necessary:

- The authorized attendant shall notify the supervisor in charge of work;
- The authorized attendant shall initiate rescue operations from outside of the confined space utilizing winches and retrieval lines, attached to the authorized entrants;
- Upon arrival at the emergency site, the emergency rescue squad will receive a situation report from the authorized attendant;
- The emergency rescue squad will enter the confined space with fully equipped life-support equipment to conduct the rescue;

- Any injured employee will receive emergency treatment at the emergency site and then, if necessary, be transported to the appropriate off-site medical facility set forth in the confined space entry permit.

The nearest fire department, rescue squad, ambulance service and other rescue personnel to be used in an emergency are set forth in the confined space entry permit.

A communication route shall be established between confined space location and emergency response personnel prior to work beginning in the confined space.

5.6 Personal Protective Equipment (PPE)

All entrants shall wear the PPE set forth in the confined space entry permit when entering a confined space.

5.7 Training

All personnel assigned to work in confined spaces shall be trained in accordance with the requirements set forth in Attachment 2.

5.8 Medical Surveillance

All employees involved in work in, about, or around a confined space must obtain medical clearance. Contents of the medical exam should be left to the examining physician in coordination with the Corporate Health and Safety Officer.

5.9 INTERFACE

The ANGRC IRP requires completion of the "Confined Space Entry Permit" (Attachment 1) for all confined space entries. Any Ogden employee or subcontractor may require completion of their own permit.

6.0 RECORDS

Records of entry permits, training, medical surveillance, and air monitoring will be maintained by the Health and Safety Program Manager as quality assurance records.

7.0 REFERENCES

29 CFR 1910.146 "Permit Required Confined Spaces"

American National Standards Institute, ANSI Z117.1-1977, "Safety Requirements for Confined Spaces."

8.0 ATTACHMENTS

1. Confined Space Entry Permit
2. Confined Space Training Requirements

CONFINED SPACE ENTRY PERMIT

Upon completion, post this permit at the entrance to the permitted confined space to be entered. This permit is revoked if conditions in the confined space change and are no longer acceptable under the guidelines of this permit.

DATE OF ISSUE____________________ EXPIRATION DATE____________________

TIME________________ TIME________________

LOCATION OF SPACE ____

DESCRIPTION OF SPACE ____

PURPOSE OF ENTRY ____

HAZARD ASSESSMENT ____

ATTENDANT(S) ____

EMPLOYEE(S) TO ENTER ____

SAFETY EQUIPMENT/REQUIREMENTS	YES	NO	PERSONAL PROTECTIVE EQUIPMENT	YES	NO
Lock out / tag out			Self contained breathing apparatus		
Pipe lines capped or blanked			Airline supplied respirator w/ escape		
Pipe lines purged or flushed			Air purifying respirator - Type______		
Mechanical ventilation			Five minute escape air bottle		
Area secure and signs posted			Safety glasses or goggles		
Tripod / retrieval system			Hard hat		
Communication equipment			Chemical resistant clothing - Type______		
O_2/LEL detector			Protective boots and/or gloves		
Fire extinguisher - Type______			Hearing protection - Type______		
Ground fault circuit interrupt			Chest harness and life line		
Lighting			Other______		

TESTS TO BE PERFORMED

TIME/DATE	%LEL (<10%)	% O_2 (19.5-22%)	H_2S PEL 10 ppm	CO PEL 35 ppm	OTHER____	OTHER____	TESTER'S INITIALS	INSTRUMENT	SERIAL NO.

Supervisor authorizing entry (Name printed)	Signature	Date

OGDEN

ATTACHMENT 1
INSTRUCTIONS FOR COMPLETING CONFINED SPACE ENTRY PERMIT

Prior to entry into any confined space, a Confined Space Entry Permit (shown in this attachment) will be completed and signed by appropriate facility supervisor or health and safety representative. This permit will provide explicit directions for individuals during the performance of all confined space entries. Instructions for completing the Confined Space Entry Permit are as follows:

DATE OF ISSUE AND TIME - Give the date and time (24 hour clock) entry permit was completed and authorized.

EXPIRATION DATE AND TIME - Give the date and time (24 hour clock) conditions of this permit expire.

LOCATION OF SPACE - Give the geographical location of the confined space.

DESCRIPTION OF SPACE - State the physical characteristics of the confined space.

PURPOSE OF ENTRY - Briefly state the scope of work to be done inside the confined space (i.e., geotechnical inspection, environmental sampling, survey).

ATTENDANT - Give the name of the employee who is qualified and will be stationed outside the space monitoring entrants and their activities.

SAFETY EQUIPMENT/REQUIREMENTS

1. Mark "yes" if outside energy sources (i.e., electrical, steam, etc.) exist which should be properly locked-out and de-energized before entry into confined space.

2. Mark "yes" if pipelines between confined space and point of isolation may contain hazardous materials which would necessitate the capping or blanking of those lines before entry.
3. Mark "yes" if pipe lines are to be purged either by flushing or venting prior to entry.
4. Mark "yes" if confined space atmosphere needs to be continuously ventilated during occupancy by mechanical methods, either exhaust or dilution, that are deemed appropriate.
5. Mark "yes" to secure site with flagging, barriers, and proper signs.
6. If point of entry is flush with ground surface and a vertical drop is in excess of eight feet, mark "yes" for use of tripod and manually operated retrieval winch to assist with ingress, egress, and emergency retrieval.
7. If entrants will be out of attendant's sight, mark "yes" for use of radios or phones to maintain communication between attendant and entrants.
8. Mark "yes" for entrant to wear an O_2/LEL detector during occupancy to alert him to oxygen deficient/enriched or explosive hazards.
9. Mark "yes" for fire extinguisher to be onsite and give type to be used in appropriate blank.
10. If electrical power for electrical tools is needed onsite or in confined space, mark "yes" for a ground-fault circuit-interrupter to be used with electrical source.
11. Mark "yes" for spark-proof light to be used inside the confined space.

PERSONAL PROTECTIVE EQUIPMENT

1. When confined space atmospheric conditions are unknown or are potentially IDLH (Immediately Dangerous to Life and Health), mark "yes" for a SCBA (self-contained breathing apparatus) to be used during occupancy.
2. When confined space atmospheres dictate the need for a SCBA and phsical characteristics of space limit the use of one, mark "yes" for supplied airline respirator.
3. When confined space atmospheric conditions present a health hazard but are not IDLH, mark "yes" for an air purifying respirator and give type to be used in appropriate blank.
4. Mark "yes" for entrants to carry an escape air pack during occupancy of space.
5. Mark "yes" for safety glasses or goggles, hard hat, and the appropriate protective clothing to be worn inside confined space.
6. Mark "yes" for hearing protection from noise and give the type to be used in the appropriate blank.
7. Mark "yes" for entrants to wear a safety chest harness during occupancy.

TEST TO BE PERFORMED

Percent of Oxygen - test for oxygen deficient/enriched atmospheres shall always be conducted during confined space operations. The Permissible Exposure Limits (PELs) are 19.5 percent for oxygen deficient and 22 percent for oxygen enriched.

Percent of Lower Explosive Limit (LEL) - LEL monitoring shall always be performed during confined space operations. Monitoring equipment will sound the alarm if concentrations of explosive gas reach 10 percent of the LEL for that gas. At that point, operations will cease until conditions are evaluated.

Carbon Monoxide, Hydrogen Sulfide, and Others - If chemicals other than CO and H_2SO_4 are known to exist, enter the names and PELs for each chemical in the appropriate spaces. Mark "yes" for each chemical to be monitored. These tests will be conducted

using direct reading colorimetric tubes for each chemical, the action level being one-half of the PEL for each chemical. If concentrations reach the action level for any chemical, operations shall cease until conditions are evaluated.

Instruments Used - Enter the name/type and serial number of the instrument to be used (e.g., MSA Model 360 LEL/O_2/CO meter), agent to be tested (e.g., O_2), frequency at which tests are to be taken inside confined space (e.g., 15 min.)

Enter tester's initials

AUTHORIZATION

1. **Permit Authorization** - Give the name of the supervisor or health and safety officer who authorizes the conditions set forth in this permit, or their designated reviewer.
2. **Signature** - The permit is not valid unless signed by the supervisor or health and safety officer authorizing it.

ATTACHMENT 2
CONFINED SPACE TRAINING REQUIREMENTS

1.0 GENERAL REQUIREMENTS

Personnel responsible for supervising, planning, entering or participating in confined space entry and rescue shall be adequately trained in their funtional duties prior to any confined space entry. Training shall include:

- An explanation of the general hazards associated with confined spaces;
- A discussion of specific confined space hazards associated with the facility, location, or operation;
- The reason for, proper use, and limitations of personal protective equipment and other safety equipment required for entry into confined spaces;
- An explanation of the permit system and other procedural requirements for conducting a confined space entry;
- How to respond to emergencies;
- Duties and responsibilities as a member of the confined space entry team;
- A description of how to recognize probable air contaminant over exposure symptoms to themselves and co-workers, and methods for alerting attendants.

1.1 TRAINING FOR SUPERVISOR OF ENTRY PERSONNEL

The supervisor authorizing or in charge of entry shall receive the aforementioned training, as well as additional training on:

- Recognizing the effects of exposure to chemical hazards known to be in the confined space;
- Use of air monitoring and interpretation of results;
- Use and selection if PPE.

1.2 TRAINING FOR AUTHORIZED ATTENDANTS

Confined space attendants must be trained in the use of self-contained breathing apparatus (SCBA), the use of special rescue equipment, and the adminstration of First Aid, as follows:

- SCBA
  - Instruction of the SCBA use,
  - Practical exercises in use of the SCBA.

- Special Rescue Equipment
  - Radio familiarization and operation,
  - Lifelines and safety belts/harnesses,
  - Procedures for summoning rescue.

- First Aid
  - Cardiopulmonary resuscitation techniques,
  - Recognition of early symptoms of exposure to toxic material and/or oxygen deficiency.

Approved/Date

HEAT STRESS

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

The purpose of this procedure is to provide information on the causes, detection, prevention, and treatment of heat stress.

2.0 SCOPE

This procedure should be utilized by all ANGRC IRP onsite personnel.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by mangement personnel and documented.

3.0 DEFINITIONS

None.

4.0 RESPONSIBILITIES

The Onsite Health and Safety Coordinator (OHSC) and Field Manager (FM) are responsible for implementing these procedures.

The Health and Safety Program Manager (HSPM) or designee is responsible for auditing or evaluating onsite activities to ensure that these procedures are implemented.

5.0 PROCEDURES

5.1 INTRODUCTION

Heat is a physical stress on the human body. Exposure to excessive heat can develop into a serious health condition known as heat stress. If the proper measures are not taken to prevent or treat heat stress, the condition can become debilitating and perhaps fatal.

The two most likely sources of heat stress that could be encountered by program personnel are external heat produced by: 1) high air temperatures and humidity; and 2) heat generated from the human body which cannot dissipate. Protective garments can greatly hinder the body's mechanism of evaporative cooling and can therefore cause the body temperature to rise.

5.2 HOW THE BODY HANDLES HEAT

Under moderate conditions of work and environmental heat, the brain regulates the body's temperature by monitoring the temperature of the blood. When the blood temperature rises above 98.6°F, the body initiates heat control mechanisms. There are two major mechanisms of thermoregulation:

5.2.1 Increased Blood Flow

As the heart begins to pump more blood towards the skin excess body heat is lost to the air through convection, radiation, evaporation and conduction depending on air temperature, humidity, and air movement.

5.2.2 Sweating

When heat loss by increased blood flow is not enough to keep the body core temperature normal, the brain signals the sweat glands in the skin to begin producing sweat (mixture of water and salts). The sweat evaporates on the skin and cools the skin surface. Sweating

does nothing to cool the body unless the sweat can evaporate from the skin. When humidity is high, evaporation of perspiration slows down or stops. As the heart labors to pump more and more blood to the surface and the sweat glands continue to pour liquids onto the skin surface, the production of internal body heat continues. If this condition is not dealt with at this stage, heat stress disorders can arise rapidly.

Because so much blood flows to the skin, less blood remains to supply the active muscles. Strength declines and the onset of fatigue may come sooner than it would otherwise. Behavioral changes can arise in the forms of reduced accuracy, comprehension, and retention.

In addition to the physiological changes described above, certain safety problems commonly arise in hot environments:

- Slippery palms
- Dizziness
- Fogging of safety eyewear
- Possible burns from accidental contact with hot surfaces.

5.3 MONITORING THE HOT WORK ENVIRONMENT

There are two commonly recognized methods to measure the work environment for heat stress. One method employs measuring the actual environment for important physical parameters. The other monitoring technique often used in tandem with environmental monitoring is personnel monitoring.

5.3.1 Air Monitoring

Evaluating the work environment to determine the degree of heat stress involves measuring four different physical factors:

- Air temperature
- Humidity
- Radiant temperature
- Air speed.

Many different ways have been devised to evaluate the above mentioned parameters. The method recognized by the American Conference of Governmental Hygienists (ACGIH) is commonly known as Wet Bulb Globe Temperature (WBGT). WBGT values are calculated based on the following equations:

(1) Outdoor with solar load
WBGT = 0.7 (WB) + 0.2 (GT) + 0.1 (DB)

(2) Indoors or Outdoors with no solar load
WBGT = 0.7 (WB) + 0.3 (GT)

WBGT = Wet Bulb Globe Temperature Index
WB = Natural Wet-Bulb Temperature
DB = Dry-Bulb Temperature
GT = Globe Temperature

These measurements are made using specialized heat stress measuring equipment. The monitoring should be made by an industrial hygienist or a qualified individual who is familiar with the instruments and work being performed.

The recommended ACGIH Threshold Limit Values (TLVs) are presented in Table HSP-3-1 below.

5.3.2 Personnel Monitoring

Individuals vary in their susceptibility to heat stress. Factors that may predispose an individual to heat stress include:

- Lack of physical fitness
- Lack of acclimatization
- Age
- Dehydration
- Obesity
- Alcohol and drug use
- Infection
- Sunburn
- Diarrhea
- Chronic disease

Table HSP-3-1

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES
(Values are given in °C and °F WBGT)

	Work Load		
Work-Rest Regimen	Light	Moderate	Heavy
Continuous Work	30.0°C 86°F	26.7°C 80°F	25.0°C 77°F
75% Work - 25% Rest, each hour	30.6°C 87°F	28.0°C 82°F	25.9°C 79°F
50% Work - 50% Rest, each hour	31.4°C 88.5°F	29.4°C 85°F	27.9°C 82°F
25% Work - 75% Rest, each hour	32.2°C 90°F	31.1°C 88°F	30.0°C 86°F

When worker must wear semipermeable or impermeable encapsulating personal protective garments the ACGIH recommended TLV's cannot be used. For these situations, employees should be monitored when the temperature in the work area is above 70°F (21°C).

To monitor an employee for heat stress, one measures:

- Heart rate. Count the radial pulse during a 30-second period as early as possible in the rest period.

  If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.

  If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

- Oral temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).

  If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period.

  If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following work cycle by one third.

  Do *not* permit a worker to wear a semipermeable or impermeable garment when his/her oral temperature exceeds 100.6°F (38.1°C).

- Body water loss, if possible. Measure weight on a scale accurate to ± 0.25 lb at the beginning and end of each work day to see if enough fluids are being taken to prevent dehydration. Weights should be taken while the employee wears similar work clothing. *The body water loss should not exceed 1.5 percent total body weight loss in a work day.*

5.4 Heat Illnesses

5.4.1 Heat Cramps

Symptoms:

- Painful spasms of muscles used during work. May occur during or after work hours.

Possible Underlying Causes:

- Drinking large quantities of water without replacing salt loss; and
- Excessive perspiration during hot work.

Treatment:

- Administer lightly salted water by mouth unless on medical restriction. Consult physician;

- Adequate salt intake with meals. Those on salt restricted diets should consult their physician for guidance; and

- Do not follow fad or restrictive diets while working in heat conditions except under physician's advice.

5.4.2 Heat Exhaustion

Symptoms:

- Skin clammy and moist. Coloring pale or muddy.

- Extreme fatigue, nausea, headache or light-headedness.

- May faint while standing. Exhibits rapid pulse and low blood pressure.

- Oral temperature normal or low, rectal temperature may be elevated to 99°F to 101°F.

Possible Underlying Causes:

- Lack of acclimatization.
- Continuous exertion in heat.
- Failure to replace water/salt lost in sweat.

Treatment:

- Remove to cooler area.

- Administer fluids by mouth (if victim is conscious) or give intravenous infusions of normal saline. This should be done under care of a physician, especially for those on medically restricted diets.

5.4.3 Heat Syncope

Symptoms:

- Fainting while standing in the heat.

Possible Underlying Causes:

- Lack of acclimatization.

Treatment:

- Remove to cooler area.

- Recovery should be prompt and complete.
- Consult physician.

5.4.4 Heatstroke

Symptoms:

- Hot, dry skin; red, mottled or bluish.
- High, rising deep body (core) temperature: 104°F and over.
- Mental confusion, belligerence, loss of consciousness, convulsions or coma as temperature rises.

Possible Underlying Causes:

- Continuous exertion in heat by unacclimatized employees.
- Lack of acclimatization.
- Obesity.
- Recent alcohol consumption.
- Dehydration.
- Individual workers' susceptibility.
- Chronic cardiovascular disease.

Treatment:

- Immediate cooling of victim by immersion in chilled water.
- Wrapping victim in wet sheet while fanning with cool, dry air.
- Sponging with cool liquid and fanning.

- Treat shock if necessary.

- Danger-Fatal if treatment is delayed. Cool body while awaiting ambulance. Inform ambulance on telephone that heat illness emergency exists.

5.5 PREVENTING HEAT STRESS

5.5.1 Acclimatization

The human body has a dramatic adaptation mechanism for working in the heat called acclimatization. Any unprepared employee when exposed for the first time to a hot work environment will develop signs of significant strain such as elevated body temperature, pounding heart, high pulse rate and sweating. But the body will over a series of days spent working in the heat, make a series of adjustments. These adjustments, which include the decreasing of body temperature and pulse rate, will occur after the individual has worked in the heat for a week for at least two hours per day.

After acclimatization has taken place, work in the heat can be performed with a major reduction in strain. This allows the employee to work more effectively under conditions that may have been intolerable before acclimatization.

An important point to emphasize -- acclimatization will not take place if workers do not drink enough water to replace body fluids lost to sweating. Also, acclimatization is gradually lost if work in heat stops. Some degree of acclimatization is lost over a weekend and a large degree would be lost over a full week. It is significant to remember that when employees are first exposed to the heat, or when they are returning from time off such as vacation, the workload should be reduced until acclimatization can occur.

5.5.2 Water Replacement

Employees must be encouraged to drink enough water to replace the water that is lost through sweating. Employees should be told to drink often -- every 20 minutes if possible

-- throughout the day. Cool water is the ideal replacement fluid. Employees who are sweating heavily must be encouraged to drink large amounts of water every 20-30 minutes whether they are thirsty or not. Thirst is a poor indicator under these conditions because by the time thirst is felt, heat stress already exists.

5.5.3 Salt Requirements

Sweat does not only contain water, salt and other electrolytes are found in sweat as well. The body needs a certain amount of salt to function properly, but using salt tablets is not recommended. Salt tablets cause stomach irritation which may result in nausea and vomiting.

Presently, it is recommended that drinking water for employees not be salted, because the normal diet should provide adequate salt intake. However, if heat cramps are observed, slightly salted water (0.1% or 1 teaspoon of salt/15 quarts water) should be provided. Caution should be taken by individuals with high blood pressure or on a sodium restricted diet.

5.5.4 Control Measures

Engineering Controls

Engineering controls are measures which may be used to reduce the stress of a hot environment. They include, but are not limited to the following:

- Use of increased general ventilation or spot cooling to reduce temperatures in the work location;

- Use of local exhaust ventilation at points of high heat production to remove large quantities of sensible and/or latent heat from the work area;

- Use of large fans to increase the air velocity over the workers and thereby increase the evaporative heat loss. (Caution: if air temperature is greater than 95°F, the use of fans will increase the heat stress. Cool the air instead). Be careful to avoid causing drafts that will disturb any existing exhaust ventilation controls;

- Application of radiant heat shielding by such methods as:

  - insulating furnace walls.

  - covering exposed body parts with clothing.

  - using reflective screens (made up of material such as polished aluminum, tin or zinc) placed between the worker and the radiant heat source to reflect the heat back to the source.

  - wearing reflective aprons or reflective clothing especially useful when the workers face the heat source;

- The elimination of steam leaks, by hooding or covering of steaming tanks, hot water drains, etc., to reduce the water vapor pressure at the work site;

- Isolation, relocation, redesign, or substitution of equipment and/or process to reduce the thermal stress at the work site; and

- A wider use of work-saving devices (such as power tools, hoists, cranes or other lifting aids) to reduce the metabolic work load.

<u>Administrative Controls</u>

Administrative work practice controls are any and all work practices or rules that may reduce the total heat stress burden. Included are:

- Acclimatization to the heat;
- A work-rest schedule designed to reduce peaks of heat stress;
- Enforcing scheduled rest breaks;
- Providing air-conditioned rest areas to give rapid recovery. This practice decreases the cumulative effects of heat exposure;
- Enforcing a schedule of frequent water breaks and provision of abundant, cool drinking water;
- Scheduling the hottest work for the coolest parts of the day;
- Where possible, moving work indoors or to air-conditioned or cooler areas;
- Assigning extra workers to highly demanding tasks to reduce the individuals' metabolic loads;
- Allowing employees to pace themselves and take rest breaks;
- Making relief workers available and ready to take over for workers who require a break; and
- Educating workers on the basic principles of preventing heat stress illnesses and on emergency response to heat illness.

Personal Protective Equipment

Personal protective equipment includes a wide range of items from ordinary work clothing to specially cooled body suits. The correct clothing depends upon the specific heat stress situation.

If the air temperature is cooler than the skin temperature, clothing will interfere with the body's capacity to lose its heat into the air. Therefore, less clothing is required.

If, however, the air temperature is higher than the skin temperature; or if there is radiant heat (i.e., from a furnace or the sun), then clothing will protect the body. The advantage of wearing clothing, however, is negated if the clothes interfere too much with the evaporation of sweat, which is a vital cooling function.

Clothes made of thin cotton fabric are ideal. They help evaporate the sweat by picking it up and bringing it to the surface. Loosely fitted clothes are also good for sweat evaporation. In contrast, tightly-fitting clothes made of synthetic fabrics interfere with evaporation.

5.6 CONTROL PROGRAM FOR HEAT STRESS

The ANGRC IPC heat stress control program includes the following elements:

- Medical Supervision of workers including preplacement physicals that evaluate fitness, weight, cardiovascular system and other conditions that may make an individual susceptible to heat illnesses. Medical evaluation during and after heat illnesses and medical release for returning to work should also be included.

- Employee Training and Education on heat stress, heat-induced illnesses and their symptoms, water and salt replacement, clothing, work practices, and emergency first aid procedures.

- Acclimatization of employees for work in the heat.
- Work-Rest Regimens with air conditioned rest areas and enforced rest breaks.
- Water Provisions of cool, plentiful water supplies and scheduled water breaks. Employees should be encouraged to weigh themselves daily to avoid dehydration.
- Environmental Monitoring using one of the heat stress indices to determine the heat load and adjust work-rest regiments accordingly.
- Forecast of Episodes of extreme heat or heat spells whereupon a number of preventive practices would be initiated.
- Reduction of Heat Stress by the proper use of engineering controls, administrative controls, or personal protective equipment.

6.0 RECORDS

Ambient temperature records and heat stress mitigation methods should be recorded in the field notebook by the OHSC or FM.

7.0 REFERENCES

Pocket Guide to Heat Stress, National Safety Council, 1985.

Threshold Limit Values and Biological Exposure Indices for 1988-1989, American Conference of Governmental Industrial Hygienists.

8.0 ATTACHMENTS

None.

Approved/Date

RESPIRATORY PROTECTION PROGRAM

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

The purpose of HSP-4 is to establish health and safety procedures for respirator use during the ANGRC IRP.

2.0 SCOPE

This procedure applies to all personnel involved on projects where respirator use by field personnel may be required.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

None.

4.0 RESPONSIBILITIES

4.1 OGDEN CORPORATE HEALTH AND SAFETY OFFICER (CHSO)

The Ogden Corporate Health and Safety Officer (CHSO) is assigned primary responsibility for the ANGRC IRP respiratory protection program, and for assuring that

the program is in compliance with federal and state regulations. The CHSO is available to train the Site Health and Safety Officers in all aspects of respirator usage and issuance.

4.2 ONSITE HEALTH AND SAFETY COORDINATOR (OHSC)

The OHSC, designated for each project, is capable of selecting, issuing, fit-testing and training program staff who have been approved to wear respiratory protection.

4.3 USER

Users are responsible for the proper use, storage and maintenance of respiratory protective equipment issued for their personal use. The equipment shall be stored in a convenient and sanitary manner. Respiratory equipment can be maintained in a clean, sanitary condition with treated towelettes, which may be obtained from the OHSC or in an Equipment Storage Room. The user shall not loan, transfer or interchange a respiratory protection device with another person. Users shall guard against damage to the respiratory protective equipment, routinely inspect and fit-test the respirator before each use and shall report any apparent defect or malfunction to their location or OHSC.

Defective equipment must be turned into the OHSC for repair or replacement. Respiratory equipment no longer in use shall be returned to the OHSC.

4.4 PROGRAM MANAGER AND/OR ONSITE HEALTH AND SAFETY OFFICER

The Program Manager (PM) or OHSC are responsible for assuring that the proper respirators are used for specific conditions, that the equipment is clean, in good repair and operating condition, and that the user is medically qualified and has received required instruction and training. The OHSC may issue respiratory equipment and perform fit-tests, if properly trained.

Assistance and advice in the training, use, and handling of respiratory equipment may be obtained from the CHSO.

5.0 PROCEDURE

5.1 BACKGROUND

The primary objective of this respiratory protection program is to limit the inhalation of harmful dusts, fumes, mists, vapors, or gases. Normally, control of toxic airborne contaminants shall be accomplished through the proper engineering design of the process, containment, and ventilation equipment. The use of respiratory protection devices shall be limited to special, infrequent or emergency operations. The use of respiratory protection devices as a substitute for engineering control measures subjects the wearer to increased stress, lowers efficiency, and increases the risk of injury by interfering with vision, freedom of motion, and the ability to communicate.

This procedure establishes responsibilities for the program management, the method for obtaining approval, and specifies available respiratory equipment. This procedure does not apply where respiratory equipment is used for protection against airborne radioactivity.

The effective use of respirators requires a planned program extending to all Ogden operations, and includes supervision by trained and experienced personnel. This procedure provides for the Company's compliance with the legal requirements of the Federal (and State, if applicable) Occupational Safety and Health Act.

5.2 REQUIREMENTS

5.2.1 Medical

Personnel to whom resistance-creating respiratory protective devices are to be issued shall be examined initially and annually thereafter by a physician retained by Ogden. The exam shall include a medical history, clinical examination of the heart and lungs, a chest X-ray, and a spirometry test.

The spirometry test shall measure the forced expiratory volume in 1 second (FEV_1) and the forced vital capacity (FVC). The ratio of the FEV_1 to the FVC shall be calculated to determine lung fitness. All spirometry shall be performed on American Thoracic Society approved equipment and by a trained National Institute of Occupational Safety and Health (NIOSH)-certified pulmonary technician.

Attachment 1 is an example of a Medical Restrictions and Limitations Form used in San Diego, California that is completed by the physician at the conclusion of the examination. The report is then sent to the OHSC where it is maintained on file. OHSC's in other locations should receive a similar document from the industrial care provider in their area.

Annually, each worker who has been issued and uses a resistance-creating respirator will be reexamined by the physician. The details of the medical exam are addressed in the Ogden Medical Surveillance Program.

5.2.2 Disqualifying Conditions

The physician may consider the following conditions as disqualifying for respiratory equipment use:

- Facial deformities and facial hair. Facial deformities or the presence of excessive facial hair/sideburns or other conditions that interfere with proper sealing of the respirator may disqualify the potential user. According to Ogden policy (see Facial Hair Policy SOP, June 1989), staff involved in the handling of or potential exposure to hazardous materials must not have facial hair which would interfere with a proper facial seal. An obstructed seal renders the respiratory protection ineffective and can cause exposures to the wearer. Such a situation can jeopardize the health and safety of the wearer and co-workers;

- History of restrictive or obstructive lung diseases. Pulmonary conditions verified by chest X-ray, clinical findings, or spirometry shall disqualify an employee for respirator use;

- History of cardiovascular disease, hypertension-symptomatic coronary artery disease, arrhythmias, or recent history of myocardial infarction shall disqualify the employee for respiratory use; and

- Perforated eardrums. Individuals with perforated tympanic eardrums cannot wear respirators in hazardous exposure areas where inhalation or absorption of toxic materials or vapors through the perforation may occur. Existence of perforation by itself shall not immediately disqualify the employee for respirator use, but the examining physician shall consider both the environment and possible control measures before reaching a final decision.

Individuals with prescription eyeglasses who are required to wear full-face respiratory equipment shall use special frames for their glasses that do not interfere with the facepiece seal. Special visual acuity and visual field requirements shall depend upon the nature of the work to be performed.

5.3 Instructions and Training

At the time of issuance, all users will be instructed and trained by the OHSC or CHSO as to the need to wear a respiratory protective device, the protection the device will provide, its limitations, sanitary care, and proper fitting. The users shall sign the Ogden issuance form, indicating that they received the required equipment, instruction and a fit test. Once per year the user will be required to attend classroom training that will cover the physiology of the respiratory system, elements of the Respiratory Protection Program, and a description of respirators (atmosphere supplying and air purifying) in addition to their uses and limitations. A written quiz accompanies the training class where retention of at least 70% of the information given must be demonstrated. Attendance rosters and completed quizzes are maintained on file with the OHSC.

Training on how to properly issue and maintain respirators is available through the CHSO.

5.4 Fit Testing Procedures

OSHA regulations require that each respirator wearer shall receive fitting instructions including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Three basic fitting procedures are described below. The OHSC must go over each method of fit-testing with the new user.

Negative pressure sealing test:

1) With a cartridge in place, have the wearer cover the porous area of the cartridge with their hand.
2) Instruct the wearer to inhale attempting to achieve a negative pressure in the face-piece.
3) Inability to achieve or maintain negative seal may be indicative of poor respirator fit or malfunction.
4) Recheck integrity of the respirator and adjust for a better seal.
5) Repeat steps 1 and 2.
6) Do not use respirator if unable to achieve a negative pressure.
7) This is not considered a qualitative fit test, but rather a quick check of respirator integrity and seal.

Positive pressure sealing test:

1) Have the wearer remove the protective covering of the exhalation valve and seal the exhalation port with their hand.
2) Instruct them to exhale slightly.
3) Inability to maintain a slight positive pressure without indications of leakage may be indicative of poor respirator fit or malfunction.

Isoamyl acetate (banana oil) qualitative fit test:

1) After successful completion of the negative and positive fit test, the OHSC will perform a qualitative fit test.

2) Remember the respirator must be fitted with an organic vapor air purifying cartridge (either black organic vapor - or - yellow organic vapor/acid gas). Isoamyl acetate is an organic vapor.
3) The OHSC crushes an isoamyl acetate (banana oil) ampule and begins the test by moving the ampule around the area of the cartridges. During the test if the wearer smells or tastes anything in the mask, they should let the OHSC know immediately.
4) Have the wearer lean their head from side to side, chin-up, and chin down all the time moving the ampule along the mask/face seal.
5) Have the wearer speak by reciting their first, middle and last name or social security number.
6) Ask the wearer to remove the mask and confirm that they can smell the isoamyl acetate. A small percentage of the population cannot smell the banana-like odor.

5.5 INSPECTION AND MAINTENANCE

On a day-to-day basis, it is the responsibility of the users to inspect, clean, and properly store their respiratory equipment. The Project Manager or OHSC are required to see that the equipment in use is clean, functioning properly, and that the user has a suitable place to store respiratory protective equipment. Treated towellettes are provided to aid in maintaining equipment in a sanitary condition. Users are instructed to bring their respirator to the OHSC at any time when the equipment is not functioning properly, is damaged, or is missing parts. Once per year, coinciding with the initial dates of issuance, users will be notified to bring their respiratory equipment to the OHSC for inspection, repair, and cleaning. The OHSC will dismantle all equipment of good condition for inspection and cleaning with the sanitizer. Any damaged equipment will be repaired or replaced. Once maintenance is complete, the cleaned/repaired respiratory equipment will be reissued to the user. The Respirator Maintenance Checklist (Attachment 3) will be completed by the OHSC and will be retained as a record of respirator inspection and maintenance.

Self-contained breathing apparatus must be inspected monthly for damage and insufficient breathing air. A tag shall be affixed to each self-contained unit and shall be initialed by the OHSC at the time of monthly inspection.

The following are inspection guidelines to follow when maintaining a half- or full-face air purifying respirator:

1. Examine the facepiece for:
   - Excessive dirt.
   - Cracks, tears, holes, or distortion.
   - Inflexibility (stretch and massage to restore flexibility).
   - Cracked or broken element holders, badly worn threads, or missing gaskets.
2. Examine headstrap for:
   - Breaks.
   - Loss of elasticity.
   - Broken buckles and attachments.
3. Examine valves for:
   - Foreign materials, detergent residue, dust particles, or human hair under the valve seat.
   - Cracks, tears, or distortions of the valve materials.
   - Improper insertion of the valve body in the facepiece.
   - Cracks, chips, or breaks in the valve body particularly the sealing surfaces.
   - Missing or defective valve cover.
4. Examine air purifying elements for:
   - Incorrect cartridge or filter for the hazard working with.
   - Incorrect installation of cartridge or filter.
   - Expired shelf or working life of the element.

5.6 EQUIPMENT TYPES AND LIMITATION

Respiratory protection is of primary importance as the lungs present the body's greatest exposed surface area. Respiratory protective devices (respirators) consist of a facepiece

connected to an air or oxygen source. The three major categories of respirators differ with respect to the air or oxygen source:

- Self-contained breathing apparatus (SCBAs) supply air from a source carried by the user.

- Air-line respirators (ALRs) respirators supply air from a source located some distance away and connected to the user by a hose, sometimes called an umbilical cord.

- Air-purifying respirators enable the user to inhale "purified" ambient air.

Because they both supply air to the user, ARLs and SCBAs are sometimes categorized together as supplied-air respirators. Table HSP-4-1 lists the relative advantages and disadvantages of SCBA, ALRs and air-purifying respirators.

Respirators are further differentiated by the type of air flow supplied to the facepiece:

- Negative-pressure respirators (also referred to as demand respirators) draw air into the facepiece via the negative pressure created by user inhalation. The disadvantage of demand respirators is if any leaks develop in the system, (i.e., a crack in the hose or an ill-fitting mask/facepiece), the user draws contaminated air into the facepiece during inhalation.

- Positive-pressure respirators (also referred to as pressure-demand respirators) maintain a slight positive pressure in the facepiece during both inhalation and exhalation. A pressure regulator and an exhalation valve on the mask maintain the mask's positive pressure at all times. If a leak develops, the regulator sends a continuous flow of clean air into the facepiece, preventing penetration of contamination ambient air. Only positive-pressure respirators are recommended for work at hazardous waste sites.

Table HSP-4-1

RELATIVE ADVANTAGES AND DISADVANTAGES OF RESPIRATORY PROTECTIVE EQUIPMENT

TYPE OF RESPIRATOR	ADVANTAGES	DISADVANTAGES
SELF-CONTAINED BREATHING APPARATUS (SCBA)	• Operated in positive-pressure mode, provides the highest available level of protection against most airborne contaminants.	• Bulky, heavy (up to 35 pounds). • Finite air supply limits work duration. • Less suitable for strenuous work or work in confined spaces.
AIR-LINE RESPIRATOR (ALR)	• Enables longer work periods than a SCBA. • Less bulky and heavy than a SCBA. ALR equipment weighs less than 5 pounds (or around 15 pounds if escape protection is included). • Protects against most airborne contaminants.	• Not approved for use in atmospheres immediately dangerous to life or health unless equipped with an emergency egress unit such as a bailout bottle. should be supplemented with a device such as an escape-only SCBA, that can provide immediate emergency respiratory protection in case of air line failure. • Impaired mobility. NIOSH limits the length of the supply air hose to 300 ft; auxiliary piping may extend this distance provided no decrease in air pressure occurs within the auxiliary piping. • Air supply hose is vulnerable to damage, chemical contamination, and degradation. Decontamination of hoses may be difficult. • Worker must retrace steps to leave work area. • Requires supervision/monitoring of the air supply line.
AIR-PURIFYING RESPIRATOR	• Enhanced mobility. • Lighter in weight than a SCBA. Generally weights 2 pounds or less. • Less expensive than a SCBA or ALR.	• Cannot be used in IDLH or oxygen-deficient (less than 19.5 percent oxygen) atmospheres. • Limited duration of protection. May be hard to gauge safe operating time in field conditions. • Only protects against specific chemicals and up to specific concentrations. • Use requires continuous monitoring of contaminant and O_2 levels. • Shall only be used against organic vapors with adequate warning properties (taste, odor, irritation, etc.

- Continuous-flow respirators send a continuous stream of air into the facepiece at all times. Continuous air flow prevents infiltration by ambient air, but exhausts the air supply much much more rapidly than positive-pressure or negative-pressure respirators.

Different types of facepieces are available for various types of respirators:

- Full facepieces cover the face from the hairline to below the chin. They are recommended for use on uncontrolled sites since they provide eye, as well as respiratory, protection;

- Half masks cover the face from below the chin to over the nose. They can be used when the airborne contaminants have been identified and are judged unlikely to irritate the eyes.

Federal regulations require the use of approved respirators. Approval numbers are clearly marked on all approved respiratory equipment. Respirators are tested by NIOSH and, if they pass the OSHA requirements specified in OSHA 30 CFR 11, are jointly approved by the Mine Safety and Health Administration (MSHA) and NIOSH. Test procedures are described in 30 CFR 11.

5.7 Equipment Selection and Issuance

Selection and issuance of the proper respirator for the protection required shall be made in accordance with the General Industry Safety Orders, 29 CFR 1910.134 sections "a through g" inclusive, and the American National Standards Institute (ANSI) standard, Practices for Respiratory Protection (Z88.2-1969). The CHSO or OHSC should be consulted in each instance where there is a concern over the adequacy or proper type of respiratory protection to use to protect against a particular contaminant.

The user will be instructed in the need, use, sanitary care, and limitations of the equipment to be issued. Every respirator wearer shall be instructed in how to check the facepiece for

proper fit and shall have the opportunity to wear the respirator in normal air, and to wear it in a test atmosphere generated by isoamyl acetate (banana oil) to qualitatively test for equipment facial fit.

Respiratory equipment will be issued on an individual basis and respiratory protective devices shall not be exchanged or loaned among users. Any equipment returned or turned in after the intended use will be cleaned and sanitized after use and before reissue.

Any equipment that shows wear or deterioration will be replaced or repaired. Users are instructed on proper storage of equipment to protect their respirator from dust, sunlight, extremes in temperature, excessive moisture, damaging chemicals, or workplace contaminants.

The selection and use of respiratory equipment shall be approved by the OHSC (See Table HSP-4-2).

5.8 USE OF RESPIRATORY PROTECTION DEVICES TO CONTROL HAZARDOUS SUBSTANCE EXPOSURE

Prior to assignment of an employee to tasks requiring the use of a respiratory protection device, a physician shall determine that the user is physically able to perform the work and use the respiratory protection equipment. The user's supervisor will request at the time of hire or assignment to activities requiring the possible use of respiratory protection that each individual potentially requiring respiratory equipment be medically certified or recertified. The OHSC will arrange for a pulmonary function test and chest x-ray to be conducted at a local industrial medical clinic or an equivalent medical facility. The OHSC will then notify the potential user of his/her appointment. The physician is to determine what health and physical conditions are pertinent in coordination with the Corporate Health and Safety Officer (CHSO). Prior to the issuance of respiratory protection equipment, the completed Medical Restrictions and Limitations Form from the physician (Attachment 1) must be completed and on file with the OHSC. The pulmonary fitness exams will be conducted annually for all Ogden employees who are required to wear

respiratory protection in the course of their job tasks. Respiratory protective device clearance medical protocol is discussed in more detail in the Ogden Medical Surveillance Program manual.

Upon receipt of the medical clearance, the OHSC will issue the appropriate equipment.

The user shall be instructed and trained as to the need to wear the protective device, the protection the device will provide, its limitations, and proper fitting.

The user of the respiratory protection device will be advised that they may leave the area any time for relief from the use of the device in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other condition that might require such relief.

When respiratory protection equipment is used, provisions must be made for adequate skin protection. Also, if the user wears prescription eye wear and is to be issued a full-face mask type respirator, a spectacle mount kit will need to be purchased from the respirator manufacturer or supplier. The user's prescription will have to be ground and mounted into the kit by an optician. The CHSO can provide assistance to the OHSC with locating an optician and getting the user's prescription filled.

Provisions must be made by the PM or OHSC for visual surveillance of, and communication with, the worker wearing atmosphere supplying respiratory protection equipment.

In the instances where atmosphere-supplied respiratory protective devices must be used, only certified breathable air will be acceptable. Special quick disconnects designed exclusively for breathable air will be the only kind of fittings allowed.

Table HSP-4-2

AVAILABLE EQUIPMENT

Equipment	Suggested Brands	Uses
Respirator		
Disposable Respirators	3M or equivalent	Nuisance dusts, dusts, and mists.
Silicone half-face dual cartridge	Willson/or equivalent	Suitable for use with chemical cartridges and particulate filters.
Chemical Cartridge		
Organic vapor BLACK	Willson or equivalent	Approved for protection against not more than 1000 ppm organic vapors.
Acid gas WHITE	Willson or equivalent	Approved for protection against not more than 10 ppm chlorine, 50 ppm hydrogen chloride, or 50 ppm sulfur dioxide.
Organic vapor/acid gases YELLOW	Willson or equivalent	Approved for protection against not more than 1000 ppm organic vapors, 10 ppm chlorine, 50 ppm hydrogen chloride, or 50 ppm sulfur dioxide.
Ammonia/methylamine GREEN	Willson or equivalent	Approved for protection against not more than 300 ppm ammonia and 100 ppm methylamine.
Filters		
High efficiency PINK or PURPLE	Willson or equivalent	Approved for protection against dusts, fumes, and mists having a time-weighted average less than 0.05 mg/m^3 and radionuclides. Can be stacked in series with any of the chemical cartridges described above.

Table HSP-4-2 (Continued)

AVAILABLE EQUIPMENT

Equipment	Suggested Brands	Uses
Dust/mist filter	Willson or equivalent	Approved for protection against dusts and mists having a time-weighted average not less than 0.05 mg/m^3 or 2 million fibers per cubic foot, and asbestos containing dusts and mists. This filter can be used in conjunction with any of the cartridges described above.
Paint spray	Willson or equivalent	Approved to be used in conjunction with the organic vapor cartridge.
Pesticide prefilter	Willson or equivalent	Approved to be used with the organic vapor cartridge in atmospheres containing less than 1000 ppm organic vapors and pesticides. Not to be used with fumigants.
Emergency Equipment		
Self-contained breathing apparatus	Scott Air-Pak Survivair Mark II	Emergency response situations or in hazardous waste handling situations requiring Level A or B respiratory protection.
Escape packs	Lifeair 5	Emergency egress only.

6.0 RECORDS

Each respirator issued to a user must be identified with the name of the person to whom it is issued. This marking of each respirator will occur at the time of equipment issuance. An Ogden form, (Attachment 2), "Respirator Issuance and Training Record" will be prepared and retained by the Site Health and Safety Officer. Records shall be maintained by the OHSC for review by federal, state, or local regulatory agencies.

7.0 REFERENCES

29 CFR 1910.134
Cal/OSHA Title 8, Section 5144

8.0 ATTACHMENTS

1. Medical Restrictions and Limitations Form
2. Respirator Issuance and Training Record
3. Respirator Maintenance Checklist

Employee Name

Employee Social Security Number

PHYSICIAN'S CERTIFICATION OF OGDEN HAZARDOUS WASTE WORKERS

I performed a hazardous waste worker physical on ______________________
(Date)

for ______________________________ and find him/her medically:
(Employee Name)

☐ Qualified for the job description as furnished.
☐ Qualified only with the following restriction(s):

____

____

____

☐ NOT qualified due to:

☐ A permanent condition
☐ A potentially correctable condition: ______________________

____

☐ Other: ______________________

____

I also find that the employee is:

☐ Qualified to wear respiratory protection.
☐ Not qualfied to wear respiratory protection.

______________________________ ______________
Examining Physician Signature Date

OGDEN

RESPIRATOR ISSUANCE AND TRAINING RECORD
INDUSTRIAL HYGIENE

DATE: __________ 1990

EMPLOYEE NAME: ______________________________

EMPLOYEE TITLE: ______________________________

MEDICAL EXAMINATION COMPLETE: ☐ Yes ☐ No Date: __________ 19___

LIMITATIONS: ☐ None ☐ Beard ☐ Glasses ☐ Dentures

Other - Explain ______________________________

____

RESPIRATOR: ______________________________

____

CARTRIDGES:

☐ Organic Vapor ☐ HEPA

☐ Organic Vapors / Acid Gas ☐ Combination (______________)

☐ Acid Gas ☐ Prefilters

☐ Ammonia

FITTING:

☐ Satisfactory Positive Pressure Test ☐ Satisfactory Negative Pressure Test

☐ Satisfactory Isoamyl Acetate Test

MAINTENANCE:

☐ Individual Daily Cleaning ☐ Disposal

☐ Storage

TRAINING:

☐ At the Time of Issuance ☐ Annual Classroom Training

EMPLOYEE SIGNATURE : ______________________________ DATE: __________ 1990

APPROVAL SIGNATURE: ______________________________ DATE: __________ 1990

RESPIRATOR MAINTENANCE CHECKLIST

Respirator User: ____________________

Respirator Type: ____________________

____

MAINTENANCE RECORD

DATE			
HEADBAND			
FACIAL SEAL			
INTAKE VALVES			
EXHALE VALVES			
CLEANESS			
HARDWARE			
OVERALL CONDITION			
INSPECTORS INITIALS			

COMMENTS: ____________________

Approved/Date

HEARING CONSERVATION PROGRAM

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

The purpose of HSP-5 is to establish procedures for the ANGRC IRP Hearing Conservation Program.

This procedure summarizes the ANGRC IRP Hearing Conservation Program. Any Staff Member who is exposed to 85 decibels for an 8-hour time-weighted average, defined as the Action Level, is included in this program.

This procedure complies with Fed/OSHA Occupational Noise Standard, 29 CFR 1910.95.

2.0 SCOPE

This procedure is applicable to all program personnel who may be exposed to 85 decibels for an 8-hour time-weighted average.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

None.

4.0 RESPONSIBILITIES

4.1 ONSITE HEALTH AND SAFETY COORDINATOR (OHSC)

- Inform the field personnel of who must wear hearing protectors and issue the equipment;
- Replace hearing protectors as necessary;
- Maintain records of task order equipment issuance;
- Provide training in the use and care of hearing protectors;
- Stock a variety of hearing protectors for employees to choose from or fit staff prior to arriving onsite;
- Notify management and supervisors of those employees who must wear hearing protectors due to a standard threshold shift or a job assignment in an area where the noise level exceeds 85 decibels; and
- Conduct or arrange for noise surveys to determine sound levels in excess of 85 decibels and recommend engineering control measures to greatly reduce or eliminate noise problems.

4.2 CORPORATE HEALTH AND SAFETY OFFICER (CHSO)

- Assures that the Program is in compliance with federal and state regulations;
- The OHSC will report any noise problems and/or employee threshold shifts to the CHSO;
- Monitoring instruments are available through the CHSO;

- The CHSO is available to perform noise surveys;

- The CHSO is available to train OHSCs in all aspects of hearing protection equipment and issuance; and

- Any changes to this SOP must be reported in writing to the CHSO.

4.3 Manager or Supervisor of ANGRC IRP Program Staff Members

- Ensure that the employees under their supervision who must wear hearing protectors do so correctly;

- Inform the OHSC when protectors must be replaced.

4.4 User

Users are responsible for wearing appropriate hearing protection equipment. Any reusable equipment shall be stored in a convenient and sanitary manner. Earmuffs and molded plugs can be maintained in a clean, sanitary condition with treated towelettes, which may be obtained from the OHSC or in the Equipment Storage Room. The user shall not loan, transfer or interchange a hearing protection device with another person. Users shall guard against damage to the hearing protective equipment, routinely inspect and properly insert or wear the equipment and shall report any apparent defect or malfunction to their OHSC.

Defective equipment must be turned into the OHSC for repair or replacement. Reusable hearing protective equipment no longer in use shall be returned to the OHSC.

5.0 PROCEDURES

5.1 MONITORING

5.1.1 Purpose

The purpose of the occupational noise monitoring program is to:

- Collect data to identify areas where occupational noise is above the action level of 85 decibels and therefore unacceptable;
- Identify employees for inclusion in the Hearing Conservation Program by virtue of their job assignment in an identified noisy area or by actual personal dosimeter monitoring data;
- Enable the proper selection of hearing protection equipment;
- Provide data that will assist in identifying the type of a noise problem and in the development of an engineered solution for an area of noncompliance; and
- Monitoring shall be repeated whenever a change in operations, equipment or controls increase noise exposure such that:

  a. Additional employees may be exposed at or above the action level; or

  b. The ability of hearing protectors to attenuate to 90 dB or less is rendered inadequate for employee protection.

5.1.2 Monitoring Equipment

Area

A sound level meter (SLM) meeting ANSI Standards is the instrument used for representative area monitoring. A SLM is available through the CHSO. The SLM may be used for measurements only by trained individuals. The CHSO is capable of providing this training.

The SLM must be calibrated before and after each survey and as often as necessary to ensure measurement accuracy.

Personal

ANSI approved noise dosimeters are the monitoring equipment used to determine the actual employee noise dose. The dosimeter must be worn by the employee throughout the work shift. The data from the dosimeter indicates the integrated time weighted-average noise dose for the monitored worker. Dosimeters and usage training are also available through the CHSO. Dosimeters must also be carefully calibrated before and after sampling occurs.

In cases of high worker mobility, significant variation in sound level, or a significant contribution by impulse noise, personal monitoring is the monitoring method required to determine compliance.

5.1.3 Employee Notification

Each employee shall be notified if they have been exposed to noise at or in excess of 85 dB for an 8-hour time-weighted average.

5.1.4 Observation of Monitoring

The employee or representative shall have the opportunity to observe any noise measurements conducted as part of this program.

5.2 AUDIOMETRIC TESTING PROGRAM

As part of the Ogden Medical Surveillance Program audiometric testing is conducted on all personnel whose job assignments may expose them to an 8-hour time-weighted noise levels at or in excess of 85 decibels.

5.2.1 Testing Personnel

Audiometric testing will be performed by a licensed or certified audiologist, otolaryngolist, or other physician, or by a technician who is certified by the Counsel of Accreditation of Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in performing the testing, interpreting the results, and handling the equipment.

5.2.2 Standard Threshold Shift

<u>Definition</u>

A standard threshold shift is defined as a change in hearing threshold relative to the baseline audiogram of an average of 10 decibels or more at 2000, 3000, and 4000 Hertz in either ear.

<u>Aging Correction</u>

In determining whether a standard threshold shift has occurred, allowances may be made for the contribution of aging (presbycusis) to the change in hearing level. The Ogden Medical Consultant will make these corrections according to the procedure, Calculations and Application of Age Corrections to Audiograms, 29 CFR 1910.95, Appendix F.

5.2.3 Baseline Audiograms

At the time of employment or within 6 months of assignment to a job task that could possibly involve exposures to an 8-hour time-weighted average at or in excess of 85 decibels, the employee shall undergo baseline testing against which subsequent audiograms will be compared.

- Employees will be notified that the baseline audiogram should be performed when preceded by at least 14 hours without exposure to workplace noise.

- Employees will also be notified to avoid exposure to high levels of non-occupational noise 14 hours immediately prior to the baseline and follow-up testing.

5.2.4 Annual Audiograms

As a part of the company provided annual physical outline in the Ogden Medical Surveillance Program, each employee will have an annual audiogram to be compared to the baseline.

The annual audiogram will be performed by a physician or a certified technician as described above for the baseline audiogram.

The employee will be informed to avoid occupational and nonoccupational sources of noise in excess of 85 decibels at least 14 hours prior to their annual audiogram.

5.2.5 Evaluation

The audiometric technician or the clinical physician will compare the annual audiogram to the baseline and determine if a standard threshold shift has occurred. The Ogden Medical Consultant will notify the OHSC of any possible threshold shifts among the staff.

- Ogden will provide additional information, if required, by the physician or technician performing the evaluation.

- If the annual audiogram results demonstrate that a standard threshold shift has possibly occurred, the employee will be retested within 30 days. The results of the retest will be considered as the annual audiogram.

5.2.6 Follow-Up Procedure

1. Notification

An employee will be notified in writing within 21 days of the determination that a standard threshold shift has occurred.

2. Additional Protective Measures

Unless the Ogden Medical Consultant determines that the standard threshold shift is not work-related or aggravated by work-related noise, the OHSC will ensure that the following steps are taken with the personnel where a standard threshold shift has been determined:

a. Staff not wearing hearing protection will be fitted with and trained in their care use. It is important to explain to these individuals that they are required to wear their hearing protection.

b. Staff already using hearing protection will be refitted and retrained in their use and care. Hearing protection offering greater attenuation may be selected and issued.

3. Nonpersistent Threshold Shifts

   If subsequent audiograms indicate that a previously determined threshold shift is not persistent, the employee will be informed of the new audiometric interpretation.

   The required use of hearing protectors by the employee may be discontinued.

5.2.7 Revised Baselines

Annual audiogram may be substituted for the baseline audiogram when, in the judgement of the Physician or technician evaluating the audiograms:

- The standard threshold shift shown in the annual audiogram is persistent, or
- The hearing threshold in the annual audiogram shows significant improvement over the baseline audiogram.

5.3 Audiometric Testing Requirements

All audiometric testing will be conducted in a medical facility by a licensed physician or certified technician. The conditions and the equipment involved in the testing will comply with the specifications stated in Cal/OSHA and Fed/OSHA regulations. A brief summary of the regulatory stipulations are presented below.

5.3.1 Test Conditions

Audiometric testing must be pure tone, air conduction, hearing threshold examination, with test frequencies including at a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hertz. Each ear will be tested separately at the specifically defined frequencies.

5.3.2 Equipment

The audiometric testing equipment must meet ANSI and OSHA standards. The examination room where the testing is conducted must also comply with OSHA standards.

- The audiometric testing equipment must be functionally checked daily.

- Acoustic calibration of the audiometer must be performed annually.

- Exhaustive calibration must be performed at least every 2 years in accordance to ANSI standards.

5.4 HEARING PROTECTORS

Ogden will make available hearing protectors to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater.

5.4.1 Description of Suggested Equipment

- EAR Ultrafit Plugs with or without cord #304-4002 (or equivalent)
- EAR Foam Insert Plugs with or without cord (or equivalent)
- EAR Muffs #1000 (or equivalent)
- EAR Muffs #1000H (or equivalent) for hardhat attachment

5.4.2 Hearing Protector Attenuation

<u>Evaluation</u>

All hearing protection available has been evaluated for attenuation using the Noise Reduction Rating (NRR). The NRR number appears on the equipment packaging. The NRR is the amount of decibels that the hearing protector will absorb if worn properly.

Hearing protection issue must attenuate employee exposure to an 8-hour time-weighted average of 85 decibels or less.

The adequacy of hearing protector attenuation will be reevaluated by the OHSC each time noise levels increase to the extent that the hearing protector may no longer be adequate to provide the necessary attenuation. Hearing protection with a higher NRR may be issued as necessary.

5.5 TRAINING PROGRAM

Ogden has developed a Hearing Conservation Program that is in place everywhere that the noise exposure is at or above an 8-hour time-weighted average of 85 decibels. All employees whose job task brings them into contact with a work area in excess of the noise levels described participates in the program and receives training.

5.5.1 Training Responsibilities

The OHSC is responsible for conducting the training and maintaining records of all hearing conservation program training.

5.5.2 Course Content

The suggested training course outline is as follows:

1. What is noise?
2. What effect does noise have on hearing?
3. Plugs or muffs – which is right for you?
4. What happens during a hearing test and what does it mean?
5. What is a Hearing Conservation Program?

5.5.3 Course Handouts/booklets

Course outlines and instruction booklets are available through the CHSO.

5.6 ACCESS TO INFORMATION

A copy of this procedure is distributed to each employee included in the Hearing Conservation Program. A copy should also be made available to employee representatives. A copy of the state and federal standard should be available from the OHSC.

Training and equipment issuance records will be maintained by the OHSC. These records will be made available to OSHA inspectors upon request.

6.0 RECORDS

6.1 NOISE EXPOSURE MEASUREMENTS

Records of noise surveys, including date, instrument identification, calibration information, name of surveyor, maps/drawings and data should be on file with the OHSC. These records will be retained for a minimum of 2 years.

6.2 Audiometric Tests

The Ogden's Medical Care Provider will maintain a record of all audiometric testing conducted as part of this and the Ogden Medical Surveillance Program. For the sake of employee confidentiality, actual audiograms will be retained at the physician's office where the testing occurred. The OHSC will receive a statement signed by the physician or technician performing the testing indicating the state of an employee's hearing. The OHSC must inform the employee within 30 days of receipt of information indicating a hearing loss. Precautionary measures will be discussed with the employee.

These records will be retained for the duration of the employee's employment plus thirty years, as is normal for all medical records.

7.0 REFERENCES

29 CFR 1910.95 Occupational Noise Exposure Standard

8.0 ATTACHMENTS

None.

PERSONNEL DECONTAMINATION

Approved/Date

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

The purpose of this procedure is to provide standard personnel decontamination methods for use during site activities at ANGRC IRP sites. In general, decontamination protects workers from hazardous substances that may contaminate and eventually permeate protective clothing, respiratory equipment, tools, vehicles, and other equipment used onsite; it protects all site personnel by minimizing the transfer of harmful materials into clean areas; it helps prevent mixing of incompatible chemicals; and it protects the community by preventing uncontrolled transportation of contaminants from the site. If contaminants that have permeated a material are not removed by decontamination, they may continue to permeate to either surface of the material where they can cause an unexpected exposure.

2.0 SCOPE

These procedures should be employed where applicable during decontamination of field personnel contacting possible contaminants, as delineated in site-specific health and safety plans.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

3.1 DECONTAMINATION

Decontamination is defined as the process of physically removing contaminants or changing their chemical nature to innocuous substances.

3.2 EXCLUSION/HOT ZONE

The Exclusion or Hot Zone (EZ) is defined as the area where contamination is the greatest. It encompasses a 30-foot radius around intrusive activities with access restricted to field sampling crews and necessary equipment operators.

3.3 TRANSITION ZONE

The Transition Zone (TZ) is defined as the area between the Exclusion and Contamination Reduction Zones. It should be established upwind of the EZ and serve as the support area for sample QA/QC and packing. Any coolers that are in this zone should be protected from contamination using polyethylene sheeting and decontaminated prior to leaving the site.

3.4 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone (CRZ) is defined as the area between the TZ and the Support or Clean Zone. Consisting of two separate decontamination lines, this is the area where both equipment and personnel are "cleaned" in order to prevent the spread of contamination. The CRZ should be marked as narrow corridors through which personnel and equipment pass from work zones to the Support or Clean Zone.

3.5 Support/Clean Zone

The Support or Clean Zone (SZ) is defined as the area of least or no contamination. It is upwind and away from the EZ and serves as the location where vehicles, emergency equipment, telephones, break areas, and all non-essential personnel remain.

4.0 RESPONSIBILITIES

4.1 Field Manager (FM)

The Field Manager is responsible for identifying instances of non-compliance with this procedure and ensuring that future field activities are in compliance with this procedure.

4.2 Onsite Health and Safety Coordinator (OHSC)

The Onsite Health and Safety Coordinator is responsible for ensuring that all personnel are decontaminated according to procedure.

4.3 Health and Safety Program Manager (HSPM)

The Health and Safety Program Manager is responsible for ensuring that all personnel comply with this procedure.

5.0 PROCEDURES

How extensive decontamination must be depends on a number of factors, the most important being the type of contaminants involved. The more harmful the contaminant, the more extensive and thorough decontamination must be. Before any work begins on a hazardous waste site, a decontamination plan should be developed and set up. The plan should:

Figure 1 - Work Zones

- Determine the number and layout of decontamination stations.
- Determine the decontamination equipment needed.
- Determine appropriate decontamination methods.
- Establish procedures to prevent contamination of clean areas.
- Establish methods and procedures to minimize worker contact with contaminants during removal of personal protective clothing and equipment (PPE).
- Establish methods for disposing of clothing and equipment that are not completely decontaminated.

The plan should be revised whenever the type of PPE changes, the site conditions change, or the site hazards are reassessed based on new information.

This subsection describes standards for decontamination. The techniques to be used based on the level of protection, frequency of decontamination, and cleaning solutions are among the standards addressed.

5.1 PERSONNEL DECONTAMINATION AREA (SEE FIGURE HSP-6-1)

An appropriate location for the personnel decontamination area at a site shall be selected based on the ability to control access to the area, control residual material removed from clothing, and store clean clothing. The decontamination area shall be located at an adequate distance away and upwind from potential contaminant sources to avoid contamination of clean areas and personnel (usually in the CRZ) and separate from the equipment decontamination area. Once personnel are clean, they shall stay sufficiently far

enough away from the potential contamination sources and the decontamination area to ensure that they remain clean.

5.2 CLEANING SOLUTIONS, EQUIPMENT, AND TECHNIQUES

Personnel decontamination can be accomplished using a variety of equipment, techniques, and solutions. The preferred method of personnel decontamination involves the use of long-handled, soft-bristled brushes, galvanized wash tubs or equivalent, pump-activated sprayer, garbage cans with plastic liners and drums with liners, visqueen, paper towels, duct tape, and a mild detergent solution. Detergents are preferred over other cleaning solutions because the detergent alone does not pose a handling or disposal problem (see Table HSP-6-1). Two of the more commonly used ones are Penetone 155, in cases where PCBs are of concern, and Alconox for general decontamination purposes. In cases where the client specifies the use of biodegradable substances, Simple Green diluted with water is the decontamination solution of choice.

5.3 LEVEL A & B DECONTAMINATION

The intermediate and final stage personnel decontamination procedures for Level A and B include the following:

- Segregated equipment drop just outside the hotline on plastic sheets (for instruments and equipment requiring special decontamination as outlined in the QAPP).

- Outer boot and glove wash with long-handled, soft-bristled brushes and decontamination/detergent solution.

- Outer boot and glove rinse with water.

Table HSP-6-1

- Outer boot removal.

- Outer glove removal.

- Protective suit and safety boot wash with long-handled, soft-bristled brushes in decontamination/detergent solution.

- Protective suit and safety boot rinse with water.

- Optional. Tank change. The self-contained breathing apparatus (SCBA) tank is exchanged for a full one. The worker receives new outer gloves and boots, which are sealed with new tape, and returns to the EZ.

- Removal of safety boots in designated receptacles.

- Removal and storage of self-contained breathing apparatus (SCBA) backpack on a table; facepiece must remain on.

- Removal and storage, on racks or plastic sheeting, of protective suit and hardhat with the assistance of a helper.

- Inner glove wash with decontamination/detergent solution.

- Inner glove rinse with water.

- Removal and storage of facepiece in a lined container for subsequent decontamination; the fingers should not touch the face.

- Removal and disposal of inner gloves in designated receptacles.

- Complete body shower if severe conditions at the site exist; otherwise, hand and face wash.

- Personnel redress and enter the SZ.

5.4 LEVEL C DECONTAMINATION (SEE FIGURE HSP-6-2)

The intermediate and final stage personnel decontamination procedures consist of the following for Level C:

- Segregated equipment drop just outside the hotline on plastic sheets (for instruments and equipment requiring special decontamination as outlined in the QAPP).

- Outer boot and glove wash with long-handled, soft-bristled brushes and decontamination/detergent solution.

- Outer boot and glove rinse with water.

- Removal of duct tape using pull tabs.

- Optional. Sample management. Removal of outer glove and storage for later use. Enter TZ for sample management, return to EZ wearing new or cleaned outer gloves.

- Removal or disposal of outer boots in designated receptacles.

- Removal and disposal (if not cleaned to "like new" condition) of outer gloves in designated receptacles.

Figure HSP-6-2 - Level C Decon Flow Chart

- Removal and disposal of coverall in designated receptacles.
- Inner glove wash.
- Inner glove rinse.
- Removal of respirator.
- Removal and disposal of inner gloves in designated receptacles.
- Enter the SZ.
- General field wash for personal hygiene.

5.5 MODIFIED LEVEL D DECONTAMINATION (SEE FIGURE HSP-6-3)

The intermediate and final stage personnel decontamination procedures consist of the following for Modified Level D:

- Segregated equipment drop just outside the hotline on plastic sheets (for instruments and equipment requiring special decontamination as outlined in the QAPP).
- Outer boot and glove wash with long-handled, soft-bristled brushes and decontamination/detergent solution.
- Outer boot and glove rinse with water.
- Removal of duct tape using pull tabs (if applicable).

Figure HSP-6-3 - Level D Decon Flow Chart

- Optional. Sample management. Removal of outer glove and storage for later use. Enter TZ for sample management, return to EZ wearing new or cleaned outer gloves.

- Removal or disposal of outer boots in designated receptacles.

- Removal and disposal (if not cleaned to "like new" condition) of outer gloves in designated receptacles.

- Removal and disposal of coverall in designated receptacles.

- Inner glove wash.

- Inner glove rinse.

- Removal and disposal of inner gloves in designated receptacles.

- Enter the SZ.

- General field wash for personal hygiene.

5.6 METHODS FOR DETERMINING THE EFFECTIVENESS OF DECONTAMINATION

Decontamination methods vary in their effectiveness for removing different substances. The effectiveness of any decontamination method should be assessed at the beginning of a program and periodically throughout the lifetime of the program. If contaminated materials are not being removed or are penetrating protective clothing, the decontamination program must be revised. The following methods may be useful in assessing the effectiveness of decontamination; visual observation is the most common method.

5.6.1 VISUAL OBSERVATION

There is no reliable test to immediately determine the effectiveness of decontamination. In general, effectiveness can be estimated by visual observation. Physical alterations such as discoloration, stains, corrosive effects, visible dirt, or changes in clothing fabric may indicate that contaminants have not been removed. However, not all contaminants leave visible traces; many contaminants can permeate clothing and are not easily observed.

5.6.2 WIPE SAMPLING

Wipe testing provides after-the-fact information on the effectiveness of decontamination. This technique can be used on clothing, equipment, and the skin of personnel. In this procedure, a dry or wet cloth, glass fiber paper, or swab is wiped over the surface of the potentially contaminated object or person and then analyzed in a laboratory. In the case of re-usable clothing, both the inner and outer surfaces should be tested.

5.6.3 EQUIPMENT RINSATE ANALYSIS

Another way to test the effectiveness of decontamination procedures is to analyze for contaminants in a rinsate sample collected from a piece of equipment (boots, respirators, etc.). Elevated levels of contaminants are an indication that additional cleaning and rinsing are needed.

5.6.4 TESTING FOR PERMEATION

Testing for the presence of permeated chemical contaminants requires that pieces of the protective garments be sent to a laboratory for analysis.

5.7 DISPOSAL

All equipment, spent solutions, and wash/rinse waters must be decontaminated and/or disposed of properly. Buckets, brushes, clothing, and other contaminated materials should be collected, placed in containers, and labeled until final disposition is determined. Spent solutions and wash/rinse waters must be collected and stored in properly labeled DOT-approved containers. Labels should clearly indicate container contents, source, location, activity, project number, and generator.

5.8 EMERGENCY DECONTAMINATION

In the event of a non-life-threatening injury in the EZ requiring first aid, the injured party should be evacuated to the decontamination line and decontaminated as much as possible or practical; contaminated clothing should be removed.

If serious injuries are sustained, life-saving care should be administered immediately without regard to decontamination. Outside garments should be removed if it does not cause delays, interfere with treatment, or aggravate the problem. If the outer garments cannot be safely removed, the individual should be wrapped in a blanket or plastic prior to transport to a medical facility. No attempt should be made to wash or rinse the individual at the site, unless they are contaminated with an extremely toxic or corrosive material which could cause severe injury or loss of life to themselves or assisting personnel.

6.0 REFERENCES

NIOSH/OSHA/USCG/EPA, 1985 Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October.

EPA, 1988 Standard Operating Safety Guides, July.

Approved/Date

DRILLING SAFETY

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

The purpose of HSP-7 is to provide ANGRC IRP personnel with procedures for general drilling safety, including aspects at sites which have been characterized as hazardous or potentially hazardous.

2.0 SCOPE

This procedure applies to all members of ANGRC IRP field teams, including contractors and subcontractors, involved in drilling and associated activities.

It is Ogden's objective to provide a safe and healthful working environment for all of its employees through the prevention of occupational injuries and illnesses. This objective will be carried out in accordance with accepted industry standards and applicable legal contractual requirements for occupational safety and health and medical practices.

Consistent with this objective, this SOP has been developed and will be coordinated by the Health and Safety Program Manager (HSPM) and each designated Onsite Health and Safety Coordinator (OHSC).

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

None.

4.0 RESPONSIBILITIES

4.1 HEALTH AND SAFETY PROGRAM MANAGER

The HSPM is responsible for implementation of this procedure.

4.2 ONSITE HEALTH AND SAFETY COORDINATOR

Onsite Health and Safety Coordinators (OHSCs) serve as the primary coordinators for all activities associated with drilling operations at field sites.

4.3 PROJECT MANAGER (PM)

PMs or designated Field Managers (FMs) are responsible for ensuring compliance with these procedures.

4.4 FIELD PERSONNEL

All field personnel involved in drilling at all locations shall be familiar with this procedure and work within the guidelines provided.

5.0 PROCEDURE

The following guidelines shall be implemented during general drilling operations.

5.1 SITE HAZARDS

5.1.1 Fire and Explosion

To lower the potential for fire or explosions at drill sites:

- Flammable liquids shall not be stored or left within 75 feet of drill rigs, pumps, grout plants, or other related machinery (includes empty/full cans).

- Smoking, open flames, or spark-producing equipment, including lighters, matches, etc., are not permitted within 75 feet of drill rigs, open wells, gasoline-driven pumps, or fuel storage areas.

- A 10 pound ABC fire extinguisher shall be located within 20 feet of any operating drill rig. Fire extinguishers should be periodically inspected by the OHSC and maintained in operating condition at all times. Records shall be kept showing the date when the equipment was last inspected, tested, or refilled.

- When refueling equipment, a fire extinguisher shall be located within 10 feet. Equipment engines shall be shut off during fueling.

- Dispensing fuel containers shall be bonded and grounded. OSHA-approved fuel cans shall be returned to a designated safe storage area after fueling is completed.

- Extreme caution shall be used during drilling if 20 percent LEL explosive gases are detected in the hole being drilled (see Section 5.2.3). Extinguish all immediately adjacent ignition sources.

- All ignition sources shall be placed upwind or crosswind of drill holes containing explosive gases greater than 10% LEL.

- If fire extinguishers are used to fight a fire, the extinguisher shall be refilled or replaced immediately after use.

5.1.2 Hazardous Noise

During drilling operations the allowable noise level of 85 dBA is routinely exceeded. Therefore:

- All workers shall wear hearing protection whenever they are working in a high noise area.

- Ear protection shall be worn if measurements have not been made and there is not an accurate way to measure the sound level to determine if ear protection is needed or if workers have to shout to communicate when they are three feet apart or less.

- Ear plugs shall be worn by all personnel within twenty-five (25) feet of split spoon driving and removal when grout plants are in operation and at any other locations where there is the potential to be exposed to hazardous noise.

5.1.3 Material Handling

To lower the potential for injuries during material handling:

- Extreme caution shall be used when lifting or moving heavy materials.

- All personnel shall have a thorough knowledge of proper lifting techniques and proper lifting techniques shall be employed.

- Two or more persons shall lift or move materials weighing 50 pounds or more together. Such materials would include 10-inch or larger augers, pumps, full 55-gallon drums (to be moved up inclines, lowered on their sides to roll, or stood up in an upright position), and bulky objects. Mechanical means such as forklifts, lift gates on trucks, or mechanical driven cable systems shall be used whenever practical.

5.1.4 Heat Stress

All workers shall be able to recognize the potential symptoms of heat stress. To limit the potential for heat stress:

- Frequent breaks shall be taken during the work day; workers should sit in the shade to cool down.

- Cold water or other drinks such as electrolytes shall be furnished to each employee as needed.

- All personnel shall be periodically monitored by their "buddy" for signs of heat stress such as profuse sweating, flushing of the skin, hot clammy skin, or dry hot skin.

- Additional information is detailed in SOP HSP-3, Heat Stress.

5.2 Specific Operations

5.2.1 Safe Operation of Drill Rigs and General Site Conditions

- The driller in charge shall assure that only qualified drillers operate the rig.

- The drill and augers shall be operated in a safe manner.

- Workers shall not climb on the mast to effect repairs.
- If cable repairs on the mast are required, the mast shall be lowered.
- If it must be left upright, an OSHA-approved ladder and safety harness shall be used to climb the mast.
- Only personnel who are qualified and trained in drilling, i.e., drillers and their helpers, shall handle equipment associated with drilling operations. Included are augers, drive rods, ropes, cables, etc.
- The rig shall be maintained at least 28 feet from overhead hazards such as power lines.
- Under no circumstances shall the drill rig be moved with the mast raised, no matter how small the distance.
- Onsite hazards shall be kept to a minimum. Items such as hand tools, rakes, shovels, etc. shall not be left lying on the ground (tripping hazards).
- All brush over four feet high in the vicinity of the drilling operations shall be cut.
- Site entry/exit pathways, as well as work areas in the exclusion zone and decontamination area, shall be defined and kept clear of all items and debris.
- Items such as pallets shall be used as platforms or walkways to provide better footing in wet and muddy work areas.

5.2.2 Split-spoon Sampling

Split-spoon soil sampling requires that an impact hammer connected to a pull rope around a "cathead" pulley be used to drive the split-spoon sampler into the hole to collect soil samples at various depths. The pull rope is manually pulled and released to lift and drop the hammer, driving the sampler into the soil. The following shall be adhered to:

- Workers who operate the driving hammer shall be thoroughly trained in the proper use of the impact hammer. Only drillers who are thoroughly trained and experienced shall operate the pull rope to drive down and pull up the sampling device.

- No one shall bend down or stand directly below the hammer while sample driving or removing is in process.

- If the sample rod must be kept straight and steady, a mechanical holding device shall be attached to the drill rig to support the sampling rods and drive the hammer.

- Before each use, the pull rope shall be inspected for wear; the knot securing the rope to the hammer will be checked to verify that it is securely tied.

- Pull rope sampling shall not be conducted when it is raining or if the rope is wet.

- Before each use, the driller, along with his helper, shall inspect the sample rods for cracks and other signs of severe wear.

- Pull ropes shall be replaced if the inspection reveals signs of severe wear such as fraying, etc.

- Rods shall be replaced and shall not be used if they are found to be cracked or otherwise damaged.

- The hammer shall be inspected before each use. Particular attention shall be given to welded areas (i.e., the handle used to attach the pull rope).

5.2.3 Safe Operation of Drill Rigs in Landfills

- The drill rig should be diesel powered and equipped with a spark-arresting muffler.

- Explosive gases should be monitored as continuously as possible using an explosimeter and oxygen meter. The meter should be kept on the rig.

- LEL readings in and around the borehole shall be immediately evaluated with an organic vapor analyzer and Draeger tubes to determine the presence of toxic gases over methane, which is explosive but essentially non-toxic.

- The rig and all ignition sources shall be placed upwind or crosswind from the borehole.

- The borehole should be saturated with water where feasible to reduce the risk of downhole explosions.

- A fire blanket should be adjacent to the rig to cover the borehole if a flare-up occurs.

- If explosive gases exceed 10 percent LEL at a radius of 5 feet outside the borehole, then at least one of the following vapor suppression/dissipation techniques shall be implemented to reduce levels:

- While the rig is operational, a high-capacity fan should be used to aid the wind in dissipating escaping vapors from the borehole. Fans should have explosion-proof wiring or be powered by a diesel-operated generator. Under no circumstances should air be directed into the borehole.

- While the rig is operational, a fire-suppressant foam such as AFFF™ may be used to reduce the potential for sparking or flare-ups. However, this technique requires the use of containment dikes, and protective coveralls and gloves, and is not recommended for use under windy conditions. The MSDS for this foam and all chemicals brought onsite must be kept onsite with the health and safety plan.

- While the rig is not operational, an inert gas (such as nitrogen or CO_2) purging system should be used to displace methane gas. Gas should be introduced to the base of the borehole with 1/4" copper tubing, at a rate of approximately 40 PSI. Subsequent vapor readings and regulator inspections should be performed in Level B (supplied air) to prevent asphyxia.

- Drilling operations should cease; crews should be placed on standby until levels are reduced by natural wind ventilation.

5.3 CONTROLS

5.3.1 Training and Medical

- All personnel working in the proximity of an operating drill rig and the support equipment required to complete wells shall be thoroughly familiar with the operational hazards involved and shall have completed the OSHA 29 CFR 1910.120 Hazardous Waste Site Operations and Emergency Response Training and annual updates. Support equipment includes grout

plants, pumps, powered earth-moving equipment such as bulldozers, backhoes, etc.

- Drilling supervisors shall be responsible for ensuring that all subordinate workers receive proper training to limit the potential for job-related injuries/illness.

- All training shall be documented and a copy of the decontamination training certificate shall be placed in the employee personnel records and forwarded to the HSPM.

- All personnel will have completed a baseline or repeat physical, and exit physical examination, as necessary, in accordance with OSHA 29 CFR 1910.120. Documentation should be forwarded to the HSPM, and placed in employee personnel records.

5.3.2 Personal Protective Equipment (PPE)

The following PPE shall be worn:

- As a minimum, hard hats, steel-toed work boots/shoes, safety glasses, and work gloves shall be worn by all workers.

- Ear protection devices such as ear plugs, ear muffs, or plugs and muff combinations shall be worn as required.

- Chemical protective clothing, goggles, and a dust respirator shall be worn by all personnel handling cement grout during grouting.

- Additional protective equipment requirements will be covered in site-specific health and safety plans.

- All protective equipment shall be provided by respective employer(s).

- Worn, damaged, or excessively soiled equipment shall be replaced as required.

5.3.3 Eating, Drinking, Chewing, or Smoking

To limit the potential for ingestion of contaminants:

- Eating, drinking, chewing or smoking, is not allowed on any drill rig or in any restricted zone.

- A break area shall be set up with a hand and face washing facility in the support zone.

- Before eating, drinking, or smoking, all personnel shall thoroughly wash their hands and face. Potable water and soap shall be supplied for this purpose.

- Alcoholic beverages of any type shall not be consumed at any time during the drilling day.

5.3.4 Equipment Safety Inspections

- All drill rigs and related support equipment and vehicles shall be scheduled for a periodic safety inspection at a minimum of every six months. The inspections shall be the responsibility of the owner/operator of the equipment. The inspections shall include, but are not limited to, all hydraulic lines and fittings for wear and damage, all cable systems and pull ropes for damage and proper installation, exhaust systems, brake systems, drill controls, etc.

- The driller in charge, along with the OHSC, shall inspect the rig on a daily basis covering all major systems as outlined above. If potentially hazardous deficiencies are found during the daily inspections, the job shall be shut down until the deficiencies are corrected and potential hazards are eliminated.

5.3.5 Air Monitoring

To lower the potential for employee and public overexposure and for fire and explosion, air monitoring should be performed at regular intervals as specified in this procedure and in site-specific health and safety plans. Readings will be documented on forms provided in the site-specific health and safety plan. In general:

- Explosivity should be monitored at the rig as continuously as possible; a meter should be placed on the rig as close to the borehole (source) as feasible.

- Toxics and explosivity should be monitored at the site perimeter, in the breathing zone of workers and in the general work area at least once per hour, or as specified in the health and safety plan. Monitoring should also be conducted with any change in site conditions or marked increases in previous readings, and/or at the discretion of the OHSC.

- Background monitoring should be conducted prior to the initiation of site activities each day, and upon mobilization of the drill to a new location.

6.0 RECORDS

No additional records are required for this procedure above and beyond standard protocol of maintaining a daily field log. All inspections, tests, and non-compliance with this procedure shall be recorded in this log.

7.0 REFERENCES

29 CFR 1910 - OSHA General Industry Standards

29 CFR 1926 - OSHA Construction Industry Standards

29 CFR 1910.120 - OSHA Hazardous Waste Site Operations and Emergency Response

SAMPLING FOR ORGANIC VAPORS AND GASES

Approved/Date

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

This procedure is intended to provide general operational guidelines for the sampling of organic vapors and gases. It should be noted that individual equipment or situations may require different procedures.

2.0 SCOPE

This document applies to all ANGRC IRP personnel involved in the general operation of sampling for organic vapors and gases.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

3.1 BREATHING ZONE

The breathing zone is defined by OSHA as 6—9 inches from the worker's mouth.

3.2 CALIBRATION DEVICE

A calibration device will make a direct measurement of volume on the basis of the physical dimensions of an enclosed space, i.e., bubble buret or SKC accuflow calibrator.

3.3 CHARCOAL SAMPLING TUBE

A charcoal sampling tube is a porous charcoal collection medium, encased in a glass tube designed to collect and hold organic vapors and gases for later analysis, e.g., a charcoal tube with 3—350 mg sections of 20/40 mesh activated charcoal for methylene chloride or a charcoal tube with a 100 mg and a 50 mg back-up section of 20/40 mesh activated charcoal for carbon tetrachloride.

3.4 EXCURSION LIMIT

For contaminants with time-weighted averages (TWAs) but no short term exposure limits (STELs), the Excursion Limit is the airborne concentration that may exceed 3 times the TWA for no more than a total of 30 minutes during a work day.

3.5 EXCURSION SAMPLE

An excursion sample is a 30-minute sample taken during the period of highest exposure potential.

3.6 FLOW RATE

A flow rate is a volume to time relationship, reported as cubic centimeters per minute (cc/min) or liters per minute (LPM). (NOTE: flow rate is established by the OSHA or NIOSH sampling method specific for the analyte.)

3.7 HIGH FLOW

A high flow is a flow rate from 750 to 5000 cc/min or 0.75 to 5 LPM.

3.7 IMPINGER

An impinger is a liquid collection medium in a variety of containment configurations, designed to capture airborne contaminants. The contaminants are drawn through the liquid by a sampling pump and are captured by solvation or a chemical reaction in the liquid. Selection of the liquid depends on the nature of the contaminant and the associated NIOSH or OSHA method specific for the analyte.

3.8 LOW FLOW

A low flow is a flow rate from 1 to 750 cc/min.

3.8 LOW FLOW SAMPLING PUMP

A low flow sampling pump is a device that will pull a specific volume of air over a specific amount of time, approximately 10 and 500 cc/min.

3.9 MAXIMUM VOLUME

A maximum volume is the maximum volume per sample set by the OSHA or NIOSH sampling method for the analyte in question. (NOTE: maximum volume directly affects the flow rate.)

3.10 MANIFOLD

A manifold is a device which holds one or more sample tubes and is usually equipped with a guard for the broken glass tip of the sample tube. It may be used to limit flow rate to the pump.

3.11 SILICA GEL TUBE

A silica gel tube is a porous silica gel collection media, encased in a glass tube designed to collect and hold organic vapors and gases for later analysis, for example, a tube with a 520 mg and a 260 mg back-up section of silica gel for methyl alcohol.

3.12 SHORT TERM EXPOSURE LIMIT (STEL)

A STEL is a 15-minute TWA concentration, that should not be repeated more than 4 times per day with at least 60 minutes between each exposure. The STEL should never be exceeded even if compliance with the 8-hour TWA is maintained.

3.13 STEL SAMPLE

A STEL sample is a sample taken over a 15-minute period and the purpose is to identify areas of non-compliance or to ensure compliance with the STEL.

3.14 TIME-WEIGHTED AVERAGE (TWA)

The TWA is the airborne concentration for a normal 8-hour work day and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

4.0 RESPONSIBILITIES

4.1 Corporate Health and Safety Manager (CHSM)

The CHSM is responsible for approving instrument procedures for issue.

4.2 Health and Safety Program Manager (HSPM)

The HSPM is responsible for development of procedures, general implementation of this procedure, distributing the approved instrument procedures, and training personnel in the use of the instruments covered by this procedure.

4.3 Onsite Health and Safety Coordinator (OHSC)

The OHSC is responsible for general field implementation of this procedure and submitting comments to the HSPM for resolution.

5.0 PROCEDURES

5.1 Equipment

- Low flow air sampling pump with a flow rate ability between approximately 10 and 500 cc/min.
- Sample medium, to be determined by OSHA or NIOSH sampling methods specific for the analyte in question.
- Tygon tubing.
- Calibration system (bubble buret or other primary calibration device).

- Appropriate device to hold medium for the worker.

5.2 Pump Preparation

- Assign the sample medium an identification number.

- Prepare the sample medium in accordance with appropriate manufacturer, NIOSH, or OSHA methods specific to the analyte.

- Attach the sample medium to the pump via the tygon tubing and set the preliminary flow rate to between 10 and 500 cc/min depending on the OSHA or NIOSH sampling method specific to the analyte in question. (NOTE: A representative sample medium must be in line for proper flow rate and calibration adjustments.) Flow rate and expected sampling time should not exceed the maximum volume.

- Calibrate the sampling pump and record on calibration record or per site requirements. (NOTE: See above notation 5.2.3. NOTE: Calibration should occur before and after use. The pump, if possible, should not to be turned off at any time until sampling is complete and post-calibration has been performed.)

- Prepare the field blanks at about the time sampling begins. These field blanks should consist of unused solid sorbent tubes from the same sample lot used for sample collection. Handle and ship the field blanks exactly as the samples but do not draw air through the blanks. Blanks should account for approximately 10 percent of the samples collected.

5.3 PERSONAL SAMPLING

- Attach the sampling pump (it should already be turned on) to the waist of the worker, being as careful as possible not to interfere with his work or work movements.

- Locate the Tygon tubing either up the back or under the arm and up the chest of the worker being sampled, so that the sampling medium at the end of the tubing is near the lapel of the worker's shirt. If needed, the tubing may be taped to the worker to minimize interference of movement.

- Attach the sample medium holder to the shirt lapel on the worker so that it is facing down and within the breathing zone (see Section 3.1, Breathing Zone).

- Conduct personal sampling according to OSHA or NIOSH sampling methods specific to the analyte, assuring the collection of excursion and STEL samples as required by the specific method. Check the pump during sampling for significant changes in flow rate. Discard sample if sample volume cannot be determined.

- Prepare and label sampling-medium field blanks at about the time sampling begins. These blanks should consist of unused sampling media from the same lot used for sampling. Handle and ship the field blanks exactly as the samples, but do not draw air through them. Field blanks should account for approximately 10 percent of the samples collected.

- At the end of the sampling period, remove the sample medium; label the sample. (NOTE: If possible do not turn off the sampling pump until post-calibration has been performed.)

- Assure proper documentation of sampling date and times, atmospheric conditions, sample medium identifications, and pre-/post-calibration; complete the workplace exposure monitoring form and calibration record.

- Carry out decontamination procedures on all sampling equipment if needed prior to removal from the work area.

- Prepare chain-of-custody form for the AIHA-accredited lab, listing all samples and blanks.

- Submit to lab using specified shipping procedures. Include samples, blanks, chain-of-custody form, and a copy of the calibration record.

5.4 Area Sampling

- Prepare a sampling pump per Section 5.2, Pump Preparation.

- Determine areas of concern such as downwind, exhaust air streams (6—8 feet away), and several locations within the work area to be sampled.

- Securely attach pump(s) to a stationary object and hang the sample medium 4 to 8 feet above the ground with the sample tube facing down.

- Sample for the full work shift or collect background vapor or gas level samples as required by the sampling plan.

- Prepare and label sampling-medium blanks at about the time sampling begins. These blanks should consist of unused sampling media from the same lot used for sampling. Handle and ship the field blanks exactly as the

samples, but do not draw air through them. Field blanks should account for approximately 10 percent of the samples collected.

- Remove the sample medium from the pump tubing; label the sample. (NOTE: Do not turn off the sampling pump until post-calibration has been performed.)

- Assure proper documentation of sampling date and times, atmospheric conditions, sample medium identifications, and pre-/post-calibration; complete the workplace exposure monitoring form and calibration record.

- Carry out decontamination procedures on all sampling equipment according to the site-specific plan.

- Prepare chain-of-custody form for the AIHA-accredited lab, listing all samples and blanks.

- Submit to lab using specified shipping procedures. Include samples, blanks, chain-of-custody form, and a copy of the calibration record.

6.0 RECORDS

6.1 CALIBRATION RECORD

Calibration records will be maintained in respective project Health and Safety records.

6.2 WORKPLACE EXPOSURE MONITORING FORM

Exposure monitoring forms will be maintained in respective project Health and Safety documents, the HSPM's files, and (if applicable) personnel records.

7.0 REFERENCES

Chemical Information Manual, U.S. Department of Labor, OSHA, Fourth Printing, November 1989.

Fundamentals of Industrial Hygiene, National Safety Council, Third Edition.

OSHA Industrial Hygiene Technical Manual, U.S. Department of Labor, OSHA, October 1988.

8.0 ATTACHMENTS

1. Calibration Record
2. Workplace Monitoring Exposure Record

OGDEN

CALIBRATION RECORD

Location: ______________________

Site: ______________________

Pump ID No.: ______________________

Last Calibration: ______________________

Sample No.: ______________________

Filter Lot. No.: ______________________

	Flowrate *
Pre-Sampling	
Post-Sampling	

* Pre and post flowrates should be within 5%.

	date	time
Start Sampling		
Stop Sampling		

Checklist:

[ ] Filter properly installed.
[ ] Filter holder frame tight.
[ ] Pump charged for 14 hours.
[ ] On/Off timer correctly set.

Filter Installed By: ______________________

Date/Time: ______________________

Filter Removed By: ______________________

Date/Time: ______________________

Indicated Flowrate: ______________________ l/min

Total Volume: ______________________ l/min

Remarks, Notes, Comments: ______________________

____

____

____

____

5/92

OGDEN

WORKPLACE EXPOSURE MONITORING RECORD

Name: ____________________ Project No.: ____________________

Soc. Sec. No.: ____________________ Project Name: ____________________

Employer/Office: ____________________ Project Dates: ____________________

Job Function: ____________________ Project Location: ____________________

SAMPLING METHOD:

- ☐ Adsorber: ____________
- ☐ Detector Tube: ____________
- ☐ Dosimeter Badge: ____________
- ☐ Filter: ____________
- ☐ Impinger: ____________
- ☐ Meter: ____________
- ☐ Other: ____________

SAMPLE TYPE:

- ☐ Area
- ☐ Background
- ☐ Biological
- ☐ Personal

WORK ZONE:

- ☐ Contamination Reduction
- ☐ Exclusion
- ☐ Support
- ☐ Other ____________

SAMPLE COLLECTION:

Sample No.: ____________ Sample Duration: ____________ (min.)

Instrument Make/Model: ____________ Sample Rate: ____________ (ml/min.)

Calibration Date: ____________ Sample Vol.: ____________ (L)

Sample Date: ____________

Collected By: ____________

Analyzed By: ____________

(Use reverse side for calculations and sketches as necessary.)

ATMOSPHERIC CONDITIONS:

Humidity (%): ☐ Low 0-30 ☐ Med 30-70 ☐ High 70-100

Wind (mph): ☐ Light 0-5 ☐ Moderate 5-20 ☐ High >20

Temp.: ________ °F Direction: ____________

ANALYTICAL RESULTS:

Contaminant	Concentration	Units	Analytical Method	Detection Limit

PPE WORN: (✓=Yes)

- ☐ Half-Face Purifying Respirator
- ☐ Full-Face Purifying Respirator
- ☐ Air Supplied Respirator
- ☐ Disposable Respirator
- ☐ Chemical Cartridge
- ☐ HEPA Cartridge
- ☐ Disposable Coverall
- ☐ Chemical Gloves
- ☐ Chemical Boots
- ☐ Slicker
- ☐ Unknown
- ☐ Safety Glasses
- ☐ Goggles
- ☐ Hearing Protection
- ☐ Other ____________

OTHER REPRESENTATIVE PERSONNEL:

____________ ____________

____________ ____________

____________ ____________

GENERAL COMMENTS:

____

____

____

Distribution: H & S Personnel File, Project File, Employee, Other____________

1/92

SAMPLING FOR AIRBORNE PARTICULATES

Approved/Date

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

This procedure is intended to provide general operational guidelines for the sampling of airborne particulates. It should be noted that individual equipment or situations may require different procedures.

2.0 SCOPE

This document applies to all ANGRC IRP personnel involved in the general operation of sampling for airborne particulates.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

3.1 BREATHING ZONE

The breathing zone is defined by OSHA as 6—9 inches from the worker's mouth.

3.2 CALIBRATION DEVICE

A calibration device will make a direct measurement of volume on the basis of the physical dimensions of an enclosed space, i.e., bubble buret or SKC accuflow calibrator.

3.3 EXCURSION LIMIT

An excursion limit is a 30-minute TWA concentration that should never be exceeded and can only occur once per day.

3.4 EXCURSION LIMIT

For contaminants with TWAs but no STELs, the Excursion Limit is the airborne concentration that may exceed 3 times the TWA for no more than a total of 30 minutes during a work day.

3.5 FLOW RATE

A flow rate is a volume to time relationship, reported as cubic centimeters per minute (cc/min) or liters per minute (LPM). (NOTE: flow rate is established by the OSHA or NIOSH sampling method specific for the analyte.)

3.6 MAXIMUM VOLUME

A maximum volume is the maximum volume per sample set by the OSHA or NIOSH sampling method for the analyte in question. (NOTE: maximum volume directly affects the flow rate.)

3.7 PARTICULATE FILTER CASSETTE

A particulate filter cassette is a porous collection medium in a plastic containment designed to capture airborne particulate or other aerosols, for example, a Tared Low Ash Polyvinyl Chloride (LAPVC) filter .5 μ for oil mist, or a mixed cellulose ester filter (MCEF) .8 μ (open face), 25 mm cassette with a 50 mm conductive cowl.

3.8 SAMPLING PUMP

A sampling pump is a device that will pull a specific volume of air over a specific amount of time.

3.9 SHORT TERM EXPOSURE LIMIT (STEL)

A STEL is a 15-minute TWA concentration, that should not be repeated more than 4 times per day with at least 60 minutes between each exposure. The STEL should never be exceeded even if compliance with the 8-hour TWA is maintained.

3.10 STEL SAMPLE

A STEL sample is a sample taken over a 15-minute period and the purpose is to identify areas of non-compliance or to ensure compliance with the STEL.

3.11 TIME-WEIGHTED AVERAGE (TWA)

The TWA is the airborne concentration for a normal 8-hour work day and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

4.0 RESPONSIBILITIES

4.1 CORPORATE HEALTH AND SAFETY MANAGER (CHSM)

The CHSM is responsible for approving instrument procedures for issue.

4.2 HEALTH AND SAFETY PROGRAM MANAGER (HSPM)

The HSPM is responsible for development of procedures, general implementation of this procedure, distributing the approved instrument procedures, and training personnel in the use of the instruments covered by this procedure.

4.3 ONSITE HEALTH AND SAFETY COORDINATOR (OHSC)

The OHSC is responsible for general field implementation of this procedure and submitting comments to the HSPM for resolution.

5.0 PROCEDURES

5.1 EQUIPMENT

- Air sampling pump (flow rate ability of between 1.0 and 5.0 LPM).
- Filter cassette, to be determined by OSHA or NIOSH sampling methods specific to the analyte in question.
- Tygon tubing.
- Calibration system (bubble buret or other primary calibration device), with soap.

- Cassette holder (type dependent on cassette type).

- Black electrical tape or shrinkable cellulose band.

5.2 Pump Preparation

- Assign the filter cassette a sample identification number.

- If using a 2- or 3-piece cassette assembly, seal the filter holder with black electrical tape or shrinkable cellulose band. Remove the cap/plug from the filter cassette and place the filter cassette in the filter holder. Then attach the filter assembly to the pump via the tygon tubing.

- Set the preliminary flow rate to between 1.5 and 3.0 LPM, depending on the OSHA or NIOSH sampling method specific to the analyte in question. A representative filter cassette must be in line for proper flow rate and calibration adjustments.

- Calibrate the sampling pump and record on calibration record per site requirements. Calibration should occur before and after use. The pump should not to be turned off at any time until sampling is complete and post-calibration has been performed.

- Charge sampling pump for 14 hours prior to use.

5.3 Personal Sampling

- Attach the sampling pump (it should already be turned on) to the waist of the worker, being as careful as possible not to interfere with his work or work movements.

- Locate the tygon tubing either up the back or under the arm and up the chest of the worker being sampled, so that the sampling medium at the end of the tubing is near the lapel of the worker's shirt. If needed, the tubing may be taped to the worker to minimize interference of movement.

- Attach the filter cassette holder to the shirt lapel on the worker so that it is facing down and within the breathing zone (see Section 3.1, Breathing Zone).

- Conduct personal sampling according to OSHA or NIOSH sampling methods specific to the analyte, assuring the collection of Excursion and STEL samples as required by the specific method. Observe the sampler frequently and terminate sampling at the first evidence of excessive filter loading or change in sample flow rate.

- Prepare the field blanks at about the time sampling begins. These blanks should consist of unused filters and filter holders from the same lot used for sampling. Handle and ship the field blanks exactly as the samples, but do not draw air through them. Field blanks should account for approximately 10 percent of the samples collected.

- At the end of the sampling period, replace the cassette cap/plug; label the sample. (NOTE: If possible do not turn off the sampling pump until post-calibration has been performed.)

- Assure proper documentation of sampling date and times, atmospheric conditions, cassette identifications, and pre-/post-calibration; complete the workplace exposure monitoring form and calibration record.

- Carry out decontamination procedures on all sampling equipment if needed prior to removal from the work area.

- Prepare the chain-of-custody form for the AIHA-accredited lab, listing all samples and blanks.

5.4 Area Sampling

- Prepare a sampling pump per Section 5.2, Pump Preparation.

- Determine areas of concern such as downwind, exhaust air streams (6—8 feet away), and several locations within the work area to be sampled.

- Securely attach pump(s) to a stationary object and hang the filter cassette 4 to 8 feet above the ground with the cassette facing down.

- Sample for the full work shift or collect background particulate samples as required by the sampling plan.

- Prepare and label sampling-medium field blanks at about the time sampling begins. These blanks should consist of unused sampling media from the same lot used for sampling. Handle and ship the field blanks exactly as the samples, but do not draw air through them. Field blanks should account for approximately 10 percent of the samples collected.

- Replace the cassette cap/plug and remove the cassette from the pump; label the sample. (NOTE: Do not turn off the sampling pump until post-calibration has been performed.)

- Assure proper documentation of sampling date and times, cassette identifications, and pre-/post-calibration; complete the workplace exposure monitoring form and calibration record.

- Carry out decontamination procedures on all sampling equipment according to the site-specific plan.

- Prepare chain-of-custody form for the AIHA-accredited lab, listing all samples and blanks.

- Submit to lab using specified shipping procedures. Include samples, blanks, chain-of-custody form, and a copy of the calibration record.

6.0 RECORDS

6.1 CALIBRATION RECORD

Calibration records will be maintained in respective project Health and Safety documents.

6.2 WORKPLACE EXPOSURE MONITORING FORM

Exposure monitoring forms will be maintained in respective project Health and Safety documents, the HSPM's file, and (if applicable) personnel records.

7.0 REFERENCES

National Safety Council. Fundamentals of Industrial Hygiene, Third Edition.

OSHA, U.S. Department of Labor. 1988. Industrial Hygiene Technical Manual. October.

OSHA, U.S. Department of Labor. 1989. Chemical Information Manual. Fourth Printing. November.

8.0 ATTACHMENTS

1. Calibration Record
2. Workplace Monitoring Exposure Record

OGDEN

CALIBRATION RECORD

Location: ______________________

Site: ______________________

Pump ID No.: ______________________

Last Calibration: ______________________

Sample No.: ______________________

Filter Lot. No.: ______________________

	Flowrate *
Pre-Sampling	
Post-Sampling	

* Pre and post flowrates should be within 5%.

	date	time
Start Sampling		
Stop Sampling		

Checklist:

[ ] Filter properly installed.
[ ] Filter holder frame tight.
[ ] Pump charged for 14 hours.
[ ] On/Off timer correctly set.

Filter Installed By: ______________________

Date/Time: ______________________

Filter Removed By: ______________________

Date/Time: ______________________

Indicated Flowrate: ______________________ l/min

Total Volume: ______________________ l/min

Remarks, Notes, Comments: ______________________

5/92

OGDEN

WORKPLACE EXPOSURE MONITORING RECORD

Name: ______ Project No.: ______

Soc. Sec. No.: ______ Project Name: ______

Employer/Office: ______ Project Dates: ______

Job Function: ______ Project Location: ______

SAMPLING METHOD:

- ☐ Adsorber: ______
- ☐ Detector Tube: ______
- ☐ Dosimeter Badge: ______
- ☐ Filter: ______
- ☐ Impinger: ______
- ☐ Meter: ______
- ☐ Other: ______

SAMPLE TYPE:

- ☐ Area
- ☐ Background
- ☐ Biological
- ☐ Personal

WORK ZONE:

- ☐ Contamination Reduction
- ☐ Exclusion
- ☐ Support
- ☐ Other ______

SAMPLE COLLECTION:

Sample No.: ______ Sample Duration: ______ (min.)

Instrument Make/Model: ______ Sample Rate: ______ (ml/min.)

Calibration Date: ______ Sample Vol.: ______ (L)

Sample Date: ______

Collected By: ______

Analyzed By: ______

(Use reverse side for calculations and sketches as necessary.)

ATMOSPHERIC CONDITIONS:

Humidity (%): ☐ Low 0-30 ☐ Med 30-70 ☐ High 70-100

Wind (mph): ☐ Light 0-5 ☐ Moderate 5-20 ☐ High >20

Temp.: ______ °F Direction: ______

ANALYTICAL RESULTS:

Contaminant	Concentration	Units	Analytical Method	Detection Limit

PPE WORN: (✓=Yes)

- ☐ Half-Face Purifying Respirator
- ☐ Full-Face Purifying Respirator
- ☐ Air Supplied Respirator
- ☐ Disposable Respirator
- ☐ Chemical Cartridge
- ☐ HEPA Cartridge
- ☐ Disposable Coverall
- ☐ Chemical Gloves
- ☐ Chemical Boots
- ☐ Slicker
- ☐ Unknown
- ☐ Safety Glasses
- ☐ Goggles
- ☐ Hearing Protection
- ☐ Other ______

OTHER REPRESENTATIVE PERSONNEL:

______ ______

______ ______

______ ______

GENERAL COMMENTS:

______

______

______

Distribution: H & S Personnel File, Project File, Employee, Other______

1/92

1.0 PURPOSE

OSHA is authorized under the Act to conduct workplace inspections. Every establishment covered by the Act is subject to inspection by OSHA compliance safety and health officers. This procedure outlines the actions to be taken in the event of a compliance visit.

2.0 SCOPE

This procedure applies to all ANGRC employees and subcontractors.

3.0 RESPONSIBILITIES

3.1 Supervisor/Field Manager - Responsible for locating an employee representative if the officer requests, contacting the home office upon arrival, answering all questions asked and taking notes of the visit.

3.2 Health and Safety Coordinator - Responsible for assisting the Supervisor/Field Manager, participating in the site walk-down and answering all questions asked.

4.0 PROCEDURE

4.1 Under the Act an OSHA compliance officer is authorized to:

- "Enter without delay and at reasonable times any factory, plant, establishment, construction site or other areas, workplace, or environment where work is performed by an employee of an employer; and to
- "Inspect and investigate during regular working hours, and at other reasonable times, and within reasonable limits and in a reasonable manner, any such place of employment and all pertinent conditions, structures, machines, apparatus, devices, equipment and materials therein, and to question privately any such employer, owner, operator, agent or employee."

4.2 Upon notification of the inspector's presence, an opening conference should be requested.

4.2.1 The inspector's name(s), agency and title from the officer's credentials will be documented. Obtain business card if available.

4.2.2 The reason for the inspection and any related information should be discussed with the officer (e.g. intent to take photographs, obtain air

samples, audit records, interview employees, inspect contractors activities, etc.).

4.3 At the opening conference various records may be requested that each facility must maintain for compliance purposes. These include, but are not limited to, the following:

- OSHA Form 200 and Employee Health and Safety Poster.
- Training records.
- Site Safety Rules and Health and Safety Plan
- Exposure monitoring data
- Hazard Communication Program including Material Data Sheets
- Medical Records

4.4 If the visit is the result of an employee complaint, the officer should leave a copy of that complaint with the Supervisor at this time.

4.5 If the officer performs workplace monitoring during the inspection, the HSC should perform monitoring in parallel.

4.6 Following completion of the inspection, the Supervisor/Field Manager will request a closing conference to discuss all findings. The officer is not allowed to leave paperwork at this time. However, discussion of the standards that were found to be violated is allowed. At this time the officer may ask how long it will take to correct the violation. Be realistic with the abatement time, it may become part of a subsequent violation.

4.7 During the closing conference a request should be made for copies of all inspection reports, photographs and monitoring results as they become available.

4.8 Upon departure of the officer, the Supervisor/Field Manager and the Health and Safety Coordinator will summarize the inspection in writing using Attachment I.

5.0 REFERENCES

All About OSHA, U.S. Department of Labor Occupational Safety and Health Administration: OSHA 2056, 1985 (revised).

6.0 ATTACHMENTS

Attachment I - Inspection Report

ATTACHMENT I

INSPECTION REPORT

Date:

Facility/Project Site:

Supervisor/Field Manager:

Health and Safety Coordinator:

The following questions should be answered on a separate sheet. Attach to this form when complete.

1. Inspectors information: name, title, address, phone (attach business card if available)

2. What was the purpose of the inspection?

3. List the contractor(s), number of workers on-site for each contractor and nature of work for each.

4. What questions did the officer ask?

5. Significant comments made during the opening conference:

6. List records, documents or plans reviewed by the officer?

7. List names and titles of all personnel participating in the inspection?

8. List significant comments, questions or standards discussed during the inspection:

9. List names and titles of employee(s) interviewed:

10. List significant comments or violations discussed during the closing conference:

1.0 PERFORMANCE OBJECTIVES

The objective of this procedure is to establish requirements for excavation activities to ensure the safety of personnel that work in or around excavations.

2.0 SCOPE

This procedure applies to all ANGRC employees and subcontractors on projects involving excavation operations.

3.0 DEFINITIONS

3.1 Competent Person - One who has specific training in, and is knowledgeable about, soils analysis, the use of protective systems, and the requirements of 29 CFR 1926, Subpart P, is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous to employees and who has the authority to take prompt corrective measures to eliminate them.

3.2 Protective System - A method of protecting employees form cave-ins, from material that could fall or roll from an excavation face or into excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

3.3 Sheeting - Members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

3.4 Shield - A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shield can be permanent structures or can be designed to be portable and moved along as work progresses. Shields may be pre-manufactured or job-built. Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

3.5 Shoring - A structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

3.6 Sloping - A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors

as the soil type, environmental conditions or exposure, and application of surcharge loads.

3.7 Trench - An excavation made below the surface of the ground. In general the depth is greater than the width at the bottom, but the width of a trench at the bottom is not greater than 15 feet.

4.0 RESPONSIBILITIES

4.1 Field Manager/Construction Supervisor- The Field Manager (FM)/Construction Supervisor (CS) or designee that are required to perform work in or around excavations are responsible and accountable for implementation of this procedure.

4.1.1 The FM/CS is responsible for:

1. Ensuring that all employees assigned to excavation activities are instructed in the types of hazards associated with excavation operations..

2. Ensuring safe work practices and techniques.

3. Conducting a pre-job safety meeting as described in Section 5.5.2.

4. Obtaining the approval from a registered professional engineer where required by this procedure.

4.2 Competent Person - Responsible to ensure daily that regulatory requirements are being followed and that the excavation is designed, constructed, and maintained in accordance with the requirements described in this procedure and accepted engineering requirements as applicable to personnel entry.

4.3 Employees - Responsible to comply with all requirements described in the excavation procedure and applicable regulatory requirements.

4.4 Health and Safety Coordinator (HSC) - Responsible for inspecting the work site. The HSC oversees monitoring of excavations for hazardous atmospheres where it has been deemed necessary.

5.0 PROCEDURE

5.1 Pre Excavation Requirements

5.1.1 Prior to the start of excavation, the Field Manager/Construction Supervisor will identify the location of utility installations such as sewer, telephone, fuel, electric, water lines, or any underground installations that may reasonably be expected to be encountered during the excavation work as determined by facility personnel. Local utility companies shall be contacted to mark the location of underground obstructions.

5.1.2 All surface encumbrances (trees, poles, boulders, etc.) that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

5.2 Excavation Work Practices

5.2.1 The competent person as defined in paragraph 3.1, shall be designated. The competent person shall have the necessary training and knowledge as discussed in paragraph 3.1

5.2.2 Competent Person shall assess potential hazards by completing a daily checklist which will be posted at the job site (See Attachment 1).

5.2.3 During the excavating process, personnel shall stand clear of operating equipment and shall be protected by potential flying objects by ensuring sufficient distance and use of shielding (vehicles, structures, etc.)

5.2.4 No employees shall be permitted to enter the excavation unless they are specifically required to do so and can enter in a safe, supervised manner. Prior to any access, the competent person shall assess the excavation to determine if the excavation is a confined space. If excavation is a confined space, reference the ANGRC confined space procedure and 29 CFR 1910.146, Permit Required Confined Space. Unauthorized persons shall not be allowed access.

5.2.5 Work in an excavation shall at all times be supervised. The Competent Person will remain outside of the excavation at all times, and will be responsible for identifying any unusual developments aboveground which may warn of impending earth movement.

5.2.6 While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

5.2.7 Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

5.2.8 No employees shall be permitted underneath or within arm swing of loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

5.2.9 A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

5.2.10 When mobile equipment is operated adjacent to an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs.

5.2.11 Adequate precautions shall be taken to prevent employee exposure to hazardous atmospheres. Atmospheric testing shall be conducted when warranted and shall be documented in the field log book.

5.2.12 Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.

1. If water is controlled or prevented from accumulating by the use of Water Removal Equipment, the Water Removal Equipment and operations shall be monitored by a competent person to ensure proper operation.

2. If the excavation work interrupts the natural drainage of surface water (streams, run-off channels), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the

excavation and to provide adequate drainage of the area adjacent to the excavation.

5.2.13 Temporary guardrails or barricades and flashing yellow lights, or other suitable warning lights shall be placed at all excavations which are close in proximity to paths, walkways, sidewalks, driveways, or thoroughfares or where there is a possibility that vehicles or people could fall into such excavations thereby causing physical harm or property damage.

5.2.14 The stability of structures adjoining the excavation shall be supported to protect employees. Excavation below the level of the base or footing of any foundation or retaining wall that could reasonably be expected to pose a hazard to employees shall not be permitted except when:

1. a support system (underpinning) is provided to ensure the safety of employees and the stability of the structure; or

2. the excavation is in stable rock; or

3. a registered professional engineer has determined that the structure will be unaffected by the excavation; or

4. a registered professional engineer has determined that such excavation will not pose a hazard to employees.

5.2.15 Evaluations and/or designs made by the registered professional engineer shall be available at the job site.

5.2.16 Sidewalks, pavements, and appurtenant structure shall not be undermined unless employees are protected from the possible collapse of such structures.

5.2.17 Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

5.2.18 Where employees or equipment are permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided. Adequate physical barrier protection shall be provided at all remote located excavations. All wells, pits, shafts, etc., shall be barricaded or covered. Temporary wells, pits, shafts, etc., shall be backfilled as soon as possible.

5.2.19 Excavations or trenches greater than 20 feet in depth shall not be entered unless protective systems are assessed and approved by a registered professional engineer as per 29 CFR 1926, Subpart P, "Excavations."

5.3 Protective Systems

5.3.1 Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with 29 CFR 1926, Subpart P, "Excavations", except when:

1. Excavations are made entirely in stable rock; or

2. Excavations are less than five feet (1.52 m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

5.3.2 Protection systems include sloping and benching systems or support systems, shield systems and other protective systems. The competent person may determine the type of protection system necessary based on the appendices and tables in 29 CFR 1926.652.

5.3.3 When protective systems designed by a registered professional engineer are required by 29 CFR 1926, Subpart P, they shall be in written form and include the following:

1. A plan indicating the size, types, and configurations of the material to be used in the protective system,

2. The identity of the registered professional engineer approving the design,

3. At least one copy of the design shall be maintained at the job site during construction of the protective system.

5.3.4 Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function.

1. Manufactured materials and equipment used for protective systems shall be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

2. When material or equipment that is used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service.

5.3.5 Installation and Removal of Support Systems (Shoring)

1. Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

2. Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

3. Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

4. Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

5. Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

6. Backfilling shall progress together with the removal of support systems from excavations.

5.4 Inspections

5.4.1 A competent person shall conduct daily inspections of excavation sites, in accordance with paragraph 5.2.1. These inspections are documented using the Excavation Checklist, Attachment 1.

5.4.2 The inspection shall be made prior to the start of work, and as needed throughout the shift. Inspections shall be made after each rainstorm or other hazard-promoting event.

5.4.3 Where the inspection finds evidence of any hazardous condition, exposed employees shall be removed from the hazardous area until necessary precautions have been taken to correct the situation.

5.5 Training

5.5.1 Individuals serving as competent persons shall be trained to perform the responsibilities defined in Section 4.2. Specifically competent persons shall be trained to the requirements of 29 CFR 1926 - Subpart P - "Excavations".

5.5.2 The Field Manager/Construction Supervisor shall conduct a pre-job safety meeting with employees working on excavation activities at the beginning of the shift. This meeting shall detail specific hazards of the work to be performed and safety precautions and procedures specific to the job.

6.0 REFERENCES

6.1 Occupational Safety and Health Administration (OSHA) Regulation 29 CFR 1926 - Subpart P - "Excavations".

6.2 Occupational Safety and Health Administration (OSHA) Regulation 29 CFR 1910.146, Permit-Required Confined Space.

6.3 Ogden Procedure Site HS-3, "Confined Space Entry Procedure".

6.4 Ogden Procedure HS-21, "Signs, Signals, and Barricades".

7.0 ATTACHMENTS

7.1 Attachment 1 - Example Checklist

EXCAVATION CHECKLIST
(TO BE COMPLETED BY A "COMPETENT PERSON")

Site Location:		
Date:	Time:	Competent Person:
Soil Type (see attached form):		
Soil Classification:	Excavation Depth:	Excavation Width:
Type of Protective System Used:		

INDICATE FOR EACH ITEM: YES - NO - OR N/A FOR NOT APPLICABLE

1. GENERAL INSPECTION OF JOB-SITE:	YES	NO	N/A
A. Surface encumbrances removed or supported.			
B. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation.			
C. Spoils, materials, and equipment set back at least 2' from the edge of the excavation.			
D. Barriers provided at all remotely located excavations, wells, pits, shafts, etc.			
E. Walkways and bridges over excavations 6' or more in depth are equipped with standard guardrails.			
F. Warning system established and utilized when mobile equipment is operating near the edge of the excavation.			
G. Employees prohibited from going under or near suspended loads.			
H. Employees prohibited from working on the faces of sloped or benched excavations above other employees.			

2. UTILITIES	YES	NO	N/A
A. Utility companies contacted and/or utilities located.			
B. Location of utilities marked when approaching the utilities.			
C. Underground installations protected, supported or removed when excavation is open.			

3. MEANS OF ACCESS AND EGRESS:	YES	NO	N/A
A. Lateral travel to means of egress greater than 25' in excavations 4' or more in depth.			
B. Ladders used in excavations secured and extended 3' above the edge of the trench.			
C. Structural ramps used by employees designed by a competent person.			
D. Structural ramps used for equipment designed by a registered professional engineer (RPE).			
E. Ramps constructed of materials of uniform thickness, cleated together on the bottom, equipped with no slip surface.			
F. Employees protected from cave-ins when entering or exiting the excavation.			

INDICATE FOR EACH ITEM: YES - NO - OR N/A FOR NOT APPLICABLE	Page 2 of 2		
4. WET CONDITIONS	YES	NO	N/A
A. Precautions taken to protect employees from the accumulation of water.			
B. Water removal equipment monitored by a competent person.			
C. Surface water or runoff diverted or controlled to prevent accumulation in the excavation.			
D. Inspections made after every rainstorm or other hazard increasing occurrence.			
5. HAZARDOUS ATMOSPHERE:	YES	NO	N/A
A. Atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficiency, combustible or other harmful contaminant exposing employees to a hazard.			
B. Adequate precautions taken to protect employees from exposure to an atmosphere containing less than 19.5% oxygen and/or other hazardous atmosphere.			
C. Ventilation provided to prevent employees exposure to an atmosphere containing flammable gas in excess of 10% of the lower explosive limit of the gas.			
D. Testing conducted often to ensure that the atmosphere remains safe.			
E. Emergency equipment, such as breathing apparatus, safety harness and line, and basket stretcher readily available where hazardous atmospheres could or do exist.			
F. Safety harness and life line used and individually attended when entering bell bottom or other deep confined excavations.			
6. SUPPORT SYSTEMS	YES	NO	N/A
A. Materials and/or equipment for support systems selected based on soil analysis, trench depth and expected loads.			
B. Materials and equipment used for protective systems inspected and in good condition.			
C. Materials and equipment not in good condition has been removed from service.			
D. Damaged materials and equipment used for protective systems inspected by a Registered Professional Engineer (RPE) after repairs and before being placed back into service.			
E. Protective systems installed without exposing employees to the hazards of cave-ins, collapses or from being struck by materials or equipment.			
F. Members of support system securely fastened to prevent failure.			
G. Support systems provided to ensure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.			
H. Excavations below the level of the base or footing approved by an RPE.			
L. Removal of support systems progresses from the bottom of and members are released slowly as to note any indication of possible failure.			
J. Backfilling progresses with removal of support system.			
K. Excavation of material to a level no greater than 2' below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.			
L. Shield system placed to prevent lateral movement.			
M. Employees are prohibited from remaining in shield system during vertical movement.			

REMARKS:

Signature: ______________________ Date: ______________

1.0 PURPOSE

The purpose of this procedure is to provide guidelines to ensure the safety and health of personnel during the removal of underground tanks.

2.0 SCOPE

This procedure applies to all ANGRC employees and subcontractors during the removal of all petroleum, oil, lubricant (POL) and fuel underground tanks. It is to be used in conjunction with all facility procedures covering the removal of underground tanks.

3.0 DEFINITIONS

3.1 Underground Storage Tank - Any tank, that has at least 10 percent of its volume underground, including underground piping connected to the tank.

4.0 RESPONSIBILITIES

4.1 Supervisor/Field Manager - Responsible for implementing the requirements of this procedure and ensuring that each employee under their supervision understands their responsibilities.

4.2 Health and Safety Coordinator - Responsible for performing monitoring of tank atmosphere, making recommendations regarding the method for removing the tank, and ensuring compliance with this procedure.

5.0 PROCEDURE

5.1 Preliminary Activities

5.1.1 The removal of underground tanks is within the scope of 29 CFR 1910.120/ 1926.65 Hazardous Waste Operations and Emergency Response (HAZWOPER). Therefore a Health and Safety Plan (HSP) must be developed in accordance with HAZWOPER prior to starting work on-site. The HSP must at a minimum define the following:

- Work zones
- Anticipated site hazards and controls
- Personnel protective equipment (PPE) required
- Special contaminants of concern
- Special storage and disposal requirements for tank contents.

5.1.2 Material safety data sheets (MSDS) must be obtained, on the tank contents, and reviewed with site personnel and contractors.

5.2 Preparation

5.2.1 Drain product piping into the tank, being careful to avoid any spillage. Cap or remove product piping.

5.2.2 Remove liquids and residues from the tank by using explosion-proof, air-driven pumps or vacuum trucks. Pump motors and suction hoses must be bonded to the tank or otherwise grounded to prevent electrostatic ignition hazards. It may be necessary to use a hand pump to remove the last few inches of liquid from the bottom of the tank.

NOTE: The Federal Resource Conservation and Recovery Act (RCRA) 42 U.S.C. Section 6901 et seq., place restrictions on disposal of certain residues that may be present in some underground tanks. Residues from the tanks that have held leaded gasoline should be treated with extreme caution. Lead compounds and other residues in the tank may be classified as hazardous wastes.

5.2.3 Remove soil covering top of tank. NOTE: Do not remove vent line prior to excavation. Review ANGRC HSP-11 "Excavation, Trenching and Shoring" for additional precautions.

5.2.4 Remove the fill pipe, gauge pipe, vapor recovery truck connection, submersible pumps, interconnecting piping, and other tank fixtures. Remove the drop tube, except when it is planned to vapor-free the tank by using an eductor. Cap or remove all non-product lines, such as vapor recovery lines, except the vent line. The vent line must remain connected until the tank is purged. Temporarily plug all other tank openings so that all vapors will exit through the vent line during the vapor-freeing process.

5.2.5 To ensure safe relief of potential tank pressure, the first blind or manway cover detached shall be done by removing every other bolt and then slowly loosening the remaining bolts.

5.3 Purging

Remove flammable vapors by one of the methods described below or, as required by local codes. These methods provide a means for temporary vapor-freeing of the tank atmosphere. However, it is important to recognize that the tank may continue to be a source of flammable vapors even after following the vapor-freeing methods. For this reason, caution must always be exercised when handling or working around tanks that have stored flammable or combustible liquids. Before initiating work in the tank area or on the tank, a lower explosive limit (LEL) reading must be taken to assess vapor concentrations in the tank and work area. All work must be done in accordance with Section 5.4, "Monitoring".

Vent all vapors from the tank at a minimum height of 12 feet above grade and 3 feet above any adjacent roof lines until the tank is purged of flammable vapors. The work area must be free from sources of ignition.

5.3.1 Inert Gas Method

Flammable and combustible vapors may be purged with an inert gas such as carbon dioxide (CO_2) or nitrogen (N_2). This method is not to be utilized if the tank is to be entered for any reason, as the tank atmosphere will be oxygen (O_2) deficient. The inert gas is to be introduced through a point near the bottom of the tank at the end of the tank opposite the vent. When inert gases are used, they must be introduced under low pressure to avoid the generation of static electricity. When using CO_2 or N_2, pressures in the tank must not exceed 5 pounds per square inch gauge.

CAUTION: The process of introducing compressed gases into the tank may create a potential ignition hazard as the result of the development of static electrical charges. The discharging device must therefore be grounded. Explosions have resulted from the discharging of CO_2 fire extinguishers into tanks containing a flammable vapor-air mixture. CO_2 extinguishers must not be used for inerting flammable atmospheres.

5.3.2 Dry Ice Method

Vapors in the tank may be displaced by adding solid carbon dioxide (dry ice) to the tank in the amount of at least 1.5 pounds per 100 gallons of tank capacity. The dry ice should be crushed and distributed evenly over the greatest possible area in the tank to promote rapid evaporation. As the dry ice vaporizes,

flammable vapors will flow out of the tank and may surround the area. Therefore, where practical plug all tank openings except the vent after introducing the solid CO_2 and continue to observe all normal safety precautions regarding flammable or combustible vapors. Make sure that all of the dry ice has evaporated before proceeding.

CAUTION: The use of dry ice or inert gases may disperse the O_2 level in the excavation, therefore O_2 readings must be taken during purging operations. Dry ice should be handled with well insulated leather or cotton gloves to protect the hands from frostbite.

5.3.3 Mechanical Ventilation Method

Flammable vapors may be exhausted from the tank by one of two methods of ventilation listed below:

NOTE: The exhausting of tank vapors as described below should be performed only if it is not feasible to inert the tank with dry ice or inert gas.

5.3.3.1 Ventilation using an eductor-type air mover driven by compressed air. The eductor-type air mover must be properly bonded to prevent the generation and discharge of static electricity. When using this method, the fill (drop) tube must remain in place to ensure ventilation at the bottom of the tank. Tanks equipped with fill (drop) tubes that are not removable should be purged by this method. An eductor extension shall be used to discharge vapors a minimum of 12 feet above grade and at least 3 feet above any adjacent roof line.

5.3.3.2 Ventilation with a diffused air blower. When using this purging method, it is imperative that the air-diffusing pipe is properly bonded to prevent the discharge of a spark. Fill (drop) tubes must be removed to allow proper diffusion of the air in the tank. Air supply should be from a compressor that has been checked to ensure a clean air supply and it is free from volatile vapors. Air pressure in the tank must not exceed 5 pounds per square inch gauge.

5.4 Monitoring

5.4.1 The tank atmosphere and the excavation area are to be regularly monitored for flammable vapors until the tank is removed from both the excavation and the site.

5.4.2 The tank vapor space is to be monitored by placing the combustible gas indicator probe into the fill opening with the drop tube removed. Readings should be taken

at the bottom, middle, and upper portions of the tank, and the instrument should be cleared after each reading. If the tank is equipped with a non-removable fill tube, readings are to be taken through another opening. Liquid product must not enter the probe. Readings of 5 percent or less of the LEL must be obtained before the tank is considered safe for removal from the ground.

5.4.3 Tanks must also be monitored for O_2, and the results considered while interpreting LEL readings. When low levels of O_2 interfere with LEL readings it is essential to ensure O_2 levels are below 5 percent for removal to proceed.

5.4.4 The excavation and surrounding area shall also be monitored for carbon monoxide (CO), hydrogen sulfide (H_2S), and other organic vapors during removal and subsequent activities. The project HSP shall be reviewed for more detail on the monitoring required, based on the tank contents.

5.5 Removal

5.5.1 After the tank has been freed of vapors and before it is removed from the excavation, plug or cap all accessible holes. One port must have an 1/8-inch vent hole to prevent the tank from being subjected to excessive differential pressure caused by temperature changes. The tank must always be positioned with this vent plug on top of the tank during subsequent transport and storage.

5.5.2 Excavate around the tank to uncover it for removal. Due to the uncertain stability and integrity of tanks, never place heavy equipment directly on top of the tank. Remove the tank from the excavation and place it on a level surface. Chock the tank to prevent movement after removal and prior to loading on a truck for transportation. Any holes in the tank shell, allowing product to leak from the tank, must be plugged.

5.5.3 After the tank is removed from the excavation, precautions must be taken to assure any vapors left in the tank do not reach a combustible level prior to conducting any additional work on the tank. If this situation occurs, the tank must be purged again.

5.6 Cleaning

Prior to disposal or removal from the site, the tank must be cleaned. The cleaning process will be dependent upon the tank's contents, coatings and contractual requirements. The HSC will determine the requirements for tank cleaning based upon

actual conditions. Entry into tanks will be considered confined space entry and must follow HSP-02 "Confined Space Entry".

5.7 Labeling

Tanks must be labeled prior to removal from the site. Regardless of the condition of the tank, the label must contain a warning against certain types of reuse. The former contents and present vapor state of each tank, including vapor-freeing treatment and data must also be indicated (Attachment I, Figure 1). The label must have legible letters at least 2 inches high. Tanks that have held leaded motor fuels (or whose service history is unknown) must also be clearly labeled (Attachment I, Figure 2).

5.8 Hoisting and Rigging

5.8.1 Backhoes or excavators used to hoist tanks must have a manufacturer's approved lifting lug and load radius/capacity chart showing the equipment is capable of performing the lift.

5.8.2 The approximate weight of the tank and remaining contents (sludges, liquids, solid) must be known prior to lifting.

6.0 TRAINING

6.1 All personnel involved in underground tank removal must be trained in accordance with 29 CFR 1926.65 "Hazardous Waste Operations and Emergency Response".

6.2 All personnel must be trained in the chemical hazards, including the MSDS's, associated with the tank removal in accordance with 29 CFR 1926.59 "Hazard Communication".

7.0 RECORDS

None

8.0 ATTACHMENTS

Attachment I - Tank Labeling

9.0 REFERENCES

9.1 Removal and Disposal of Used Underground Petroleum Storage Tanks; American Petroleum Institute Recommended Practice 1604, Second Edition, December 1987.

9.2 Cleaning Petroleum Storage Tanks; American Petroleum Institute Publication 2015, Third Edition, September 1985.

9.3 Occupational Safety and Health Administration, 29CFR 1910.120 and 29CFR 1965.65, "Hazardous Waste Operations and Emergency Response"

9.4 Occupational Safety and Health Administration, 29 CFR 1926.59, "Hazard Communication"

9.5 ANGRC Procedure HSP-02, "Confined Space Entry"

9.6 ANGRC Procedure HSP-11, "Excavation, Trenching and Shoring"

ATTACHMENT I

TANK LABELING

Figure 1

TANK HAS CONTAINED _(fill in blank)**_

NOT VAPOR FREE

NOT SUITABLE FOR STORAGE OF FOOD OR LIQUIDS
INTENDED FOR HUMAN OR ANIMAL CONSUMPTION

DATE OF REMOVAL: MONTH/DAY/YEAR

** GASOLINE, DIESEL or other liquid.

Figure 2

TANK HAS CONTAINED LEADED GASOLINE

LEAD VAPORS MAY BE RELEASED IF HEAT
IS APPLIED TO THE TANK SHELL

1.0 PURPOSE

This procedure establishes the minimum requirements for the protection of employees working on systems, machines or equipment, where the unexpected energization, start-up or release of stored energy could cause injury. It shall be used to ensure that the system, machine or equipment is isolated from all potentially hazardous energy sources, and locked and/or tagged out prior to employees starting work in the affected areas.

2.0 SCOPE

This procedure applies to all ANGRC employees and subcontractors. It is to be used in conjunction with any existing facility procedures where work in to be performed.

3.0 DEFINITIONS

3.1 **Affected Employee** - Employees whose jobs require them to operate or use systems, machinery or equipment that is being serviced or maintained or whose jobs require them to work in areas where service or maintenance is being performed.

3.2 **Authorized Employee** - A person who locks out and/or tags out systems, machinery or equipment in order to perform service or maintenance on that system, machine or equipment and has been properly trained in the control of hazardous energy sources.

3.3 **Energy Source** - Any source of electrical, pneumatic, chemical, thermal or other energy.

3.4 **Lockout** - The placement of a lockout device on an energy isolating device, ensuring that the equipment being controlled cannot be operated until the lockout device is removed.

3.5 **Tagout** - The placement of a tagout device to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

3.6 **Primary Control** - The Construction Supervisor/Field Manager (CS/FM) lock or tag. The first lock/tag to be applied and the last lock/tag to be removed from all isolation points.

4.0 RESPONSIBILITIES

4.1 Construction Supervisor/Field Manager (CS/FM)

- Responsible to ensure all authorized employees are trained in accordance with OSHA 29 CFR 1910.147 "The Control of Hazardous Energy (Lockout/Tagout)" and section 5.0 of this procedure.
- Responsible for identifying all work activities requiring the isolation and lockout/tagout of hazardous energy sources.
- Responsible for coordination with the facility point of contact to ensure notification of all affected employees.
- Responsible for issuing the locks and tags to authorized employees.

4.2 **Health and Safety Coordinator** - Responsible for conducting a periodic inspection of this procedure at least annually to ensure that the procedure and the requirements of OSHA 29 CFR 1910.147 are being followed.

5.0 PROCEDURE

5.1 Prior to the start of a project the work shall be surveyed to identify activities which require the isolation of a system, machine or equipment.

5.2 Isolation

5.2.1 Prior to the shutdown of a system, machine or equipment the CS/FM shall notify the facility point of contact and all affected employees.

5.2.2 Upon shutdown the CS/FM shall place a lock on all isolation points, capable of being locked. All isolation points which are not capable of being locked shall be tagged. Tags shall be considered the equivalent of a lock when utilized.

5.2.3 The CS/FM lock or tag shall be considered the primary control. The primary control shall be the first lock/tag applied and the last removed.

5.2.4 Prior to starting work each authorized employee shall apply their locks/tags to the isolation points.

5.2.5 When multiple isolation points are involved, a central lock box may be utilized. When used, the CS/FM shall place the keys of all primary control locks into the lock box and then lock the box. Each authorized employee will then apply their lock to the lock box, thus controlling all isolation points.

5.2.6 When necessary, an adapter or multi-locking device may be used to attach one or more locks to a single control mechanism.

5.2.7 Prior to starting work, each authorized employee shall verify that isolation and deenergization of the system, machine or equipment has been accomplished. This shall be done by operating the normal operation controls to make certain the system, machine, or equipment will not operate.

5.3 Removal of Isolation

5.3.1 When work is complete, each authorized employee shall remove only his or her own lock or tag.

5.3.2 Before removal of the primary controls the following shall be checked:

- all necessary guards have been replaced
- the affected area has been cleaned and all tools removed
- all affected personnel have been notified

After these items are complete the CS/FM shall remove all primary controls. The system, machine or equipment may now be reactivated.

5.4 Removal of Another Employees Lock

5.4.1 Authorized employees should be instructed to remove their locks after completing their portion of the work or when leaving the effected area for extended periods of time.

5.4.2 When it becomes necessary to remove the lock of an employee who is absent from the job site the following shall be followed:

- The employees supervisor shall verify that indeed the lock owner is absent from the site.

- All reasonable attempts shall be made to notify the employee.

- The CS/FM may now direct the removal of the lock.

- The employees supervisor shall be responsible for making immediate notification to the employee upon return to the site.

- All actions shall be documented by the CS/FM in the project log book.

5.5 Controls Devices

5.5.1 Locks

All locks used for lockout devices shall be substantial enough to prevent removal without the use of excessive force and all locks shall be red in color. Red locks shall not be used for any other purpose. All locks used for lockout shall be identified with the authorized employees name.

5.5.2 Tags

Tags shall be constructed and printed so that exposure to weather conditions will not cause the tag to deteriorate or the message to become illegible. All tags shall have a standard message (Attachment 1). The tag attachment means shall be a non-reusable type, attachable by hand, self locking, and non-releasable with a minimum unlocking strength of not less than 50 pounds. They shall be at least equivalent to a one piece all environmental tolerant nylon cable tie.

6.0 TRAINING

6.1 Each authorized employee shall receive training in this procedure, the recognition of hazardous energy sources, the type and magnitude of the energy in the workplace, and the methods and means necessary for energy isolation and control.

6.2 When isolation points cannot be locked and tags are used, employees shall also be trained in the following, as listed in OSHA 29 CFR 1910.147:

- Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.

- When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

- Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.

- Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

- Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

6.3 Retraining shall be provided for employees whenever there is a change in the job assignments.

7.0 RECORDS

Records of training and annual program inspections will be maintained in the project files.

8.0 REFERENCES

8.1 OSHA 29 CFR 1910.147 "The Control of Hazardous Energy (lockout/tagout)"

8.2 DOE/ID-1044 "Construction Safety Reference Guide"

9.0 ATTACHMENTS

9.1 "Danger - Do Not Operate" Tag

ATTACHMENT 1

DANGER
DO NOT OPERATE PERSONNEL PROTECTION Lockout/Tagout

DANGER
Tag No.: Device Position: Applied By Name: Company: Date:

1.0 PURPOSE

ANGRC recognizes that both management and staff have responsibilities for implementing proper health and safety procedures during site work. The Safety Task Assignment technique (STA) is established to ensure that communication between the supervisors and workers is conducted on all tasks involving potential hazards related to the environment, safety, and Industrial Hygiene.

2.0 SCOPE

This procedure applies to all ANGRCemployees and subcontractors.

3.0 RESPONSIBILITIES

3.1 **Supervisors** - It is the responsibility of all levels of construction/remediation/ supervision to give STA individually, or in a group setting, with affected employees before work is started. The site-specific Health and Safety Plan, permits, assigned work tasks, etc. should be reviewed as a source for STA.

3.2 **Employees** - Employees shall comply with the requirements identified during the safety task assignment discussions and all other identified safety rules and requirements.

3.3 **Health and Safety Coordinator (HSC)** - The Health and Safety Coordinator will monitor the effectiveness of the STA program.

4.0 PROCEDURES

4.1 All jobs or tasks should be analyzed to uncover potential hazards associated with the work. The STA discussion may vary depending upon the hazard level of the work, the potential for a serious accident or injury to occur, and details provided in the work package. STA instruction is providing the measures for employees to perform their work safely, effectively, and efficiently.

4.2 STA is showing or explaining, or both, to each employee the safety application that pertains to the job he or she is to do. New employees may require more time and details than the more experienced ones in order to fully understand what is expected of them. The STA should be done at the job site, if possible, to more clearly explain conditions or practices. The STA may require a few words, but in many cases will require actual demonstration of how the job can be done safely and pointing out the hazards that may or will be encountered in the task or job.

4.3 Prior to conducting work each day or shift, the supervisors shall discuss the safety aspects of the work to ensure all employees associated with each task understand their responsibilities, are aware of the hazards, safety equipment requirements, and how to conduct their work safely. The discussion should include the following, as deemed appropriate:

1. Review site-specific Health and Safety Plan (HASP), work task requirements, etc. and ensure everyone understands it.

2. Identify potential imminent danger or serious situations associated with the work and explain how employees are to conduct the work in order to protect themselves.

3. Discuss the types of work permits that are required on the job and the employees' responsibilities.

4. Ensure the personal protective equipment required at the work location or required by the site-specific HASP is available, in good condition, and that employees understand how to use it.

5. Review other pertinent documents or procedures associated with the work package, such as procedures, drawings, and other documents, as needed, to ensure employees understand the nature and extent of the work.

6. Discuss the type of work that is planned for the day and how to conduct it safely. Each step of the job, where a safety hazard exists, should be discussed and the hazard removed, if possible, or adequate safe guards instituted, such as physical barriers, personal protective equipment, or approved administrative controls.

7. STA may be needed more than once per day depending upon the complexity of the work, the hazard level, and when new employees are added to the work force.

4.4 Workers shall be informed of their right to refuse any activity they feel is unsafe.

1.0 PERFORMANCE OBJECTIVE

The objective of this procedure is to establish the safety requirements for the design, application, and use of signs, tags, flagging, barricades, and barriers.

2.0 SCOPE

2.1 This procedure applies to all ANGRC employees and subcontractors who design, procure, apply, or use signs, tags, flagging, barricades, or barrier devices on (a) construction areas, and (b) sidewalks, pathways, streets, and roadways through and adjacent to construction areas managed by ANGRC.

2.2 This procedure does not apply to bulletin boards or to safety posters.

3.0 DEFINITIONS

3.1 Barricades - Fixed or portable devices, having one to three diagonally marked horizontal rails supported by a stable base, used to control vehicular and pedestrian traffic by closing, restricting, or delineating all or a portion of an established travel route.

3.2 Barriers - Fixed or portable devices designed to prevent vehicles from physically entering an area.

3.3 Flagging - High visibility tape, chain, rope, and/or bunting used to warn personnel of a hazardous location or operation.

3.4 Guardrails - Protective structure, having top and intermediate rails, and support posts, used to prevent pedestrians from physically entering an area.

3.5 Signs - A piece of metal, plastic, wood, or paper marked with words and/or symbols and/or color-coded and located to convey a message to personnel observing the sign.

3.6 Tags - A strong strip of paper, plastic, fabric, metal or leather designed for attachment to an object and marked as a visual warning of a hazardous condition or operation.

4.0 RESPONSIBILITIES

4.1 Supervisors

Supervisors and subcontractors are responsible for:

1. Implementing the requirements of this procedure;

2. Ensuring that each employee under their supervision understands his/her responsibilities and complies with the requirements of this procedure;

3. Ensuring that hazards and hazardous operations which cannot be eliminated from the work place are identified, marked, and guarded by appropriate barrier, barricade, flagging, guardrails, signs, and/or tags; and

4. Ensuring that barriers, barricades, flagging, guardrails, signs and tags conform to the requirements of this procedure.

4.2 Employees

Subcontractor employees are responsible for:

1. Informing supervisors of all hazards and hazardous operations which cannot be eliminated from the work place; and

2. Ensuring that personnel in the work place observe the instructions, directions, and intent of the barriers, barricades, flagging, guardrails, signs, and tags.

4.3 Health and Safety Coordinator (HSC)

The HSC, or designee is responsible for conducting periodic surveillance to ensure compliance with all requirements of this procedure.

5.0 PROCEDURES

5.1 Administrative Controls

5.1.1 The HSC shall evaluate the scope of work to identify, insofar as possible, any Safety, Sign and Barricade concerns which may be involved in the work to be performed.

5.1.2 Upon evaluation of the work to be performed, identify the necessary means to minimize danger to employees.

5.1.3 All required Safety Signs and Barricades shall be erected prior to the initiation of construction activities or as necessitated by the work performed.

5.1.4 Follow up surveys shall be conducted by the construction supervisor to evaluate job safety and the effectiveness of the Safety Sign or Barricade.

5.1.5 The HSC shall perform periodic surveillance of the jobs to ensure compliance with set forth requirements of this procedure.

5.2 Barricades

5.2.1 Barricades shall be used on or around work areas when it is necessary to prevent the inadvertent intrusion of pedestrian traffic.

5.2.2 Barricades shall not be placed within two feet of the edge of an excavation.

5.2.3 Barricade rails shall (1) consist of either 8, 10, or 12-inch (nominal) lumber, plastic, or metal; (2) be at least 24 inches long; (3) be mounted horizontally at least 36 inches above the ground; and (4) marked with alternate orange and white 45 degree diagonal stripes.

5.2.4 Barricade rails shall be supported by a stable base which will resist a 16 pound lateral force applied to the support 30 inches above the floor, platform, runway, ramp, or ground.

5.3 Barriers

5.3.1 Barriers shall be used to guard excavations across or adjacent to streets or roadways.

5.3.2 Barriers shall not be placed within two feet of the edge of the excavation.

5.3.3 Barriers shall be (1) constructed of solid material such as concrete highway bumpers, so as to protect personnel from the inadvertent intrusion of vehicular traffic, (2) a minimum of 36 inches in height, and (3) painted, marked, and/or illuminated to enhance their visibility.

5.3.4 Barriers shall be used on or around work areas when it is necessary to protect personnel from the inadvertent intrusion of vehicular traffic.

5.4 Flagging

5.4.1 The flagging shall be positioned such that its lowest point (including sag) is no less than 34 inches and its highest point is no more than 39 inches.

5.4.2 Tape and chain used as flagging shall have a minimum width of 3/4 inch; rope and bunting used as flagging shall have a minimum rope diameter of 1/4 inches. Minimum tensile strength shall be 500 pounds. Additional signs may be attached to the flagging when appropriate.

5.4.3 Flagging shall be placed at least six feet laterally from the hazard being identified.

5.4.4 Flagging shall not be used as a substitute for barricades or barriers; however, when there is no imminent danger to personnel, the short-term (less than 24 hours) use of flagging to identify new, unplanned hazards while appropriate barricades or barriers are being created is permissible.

5.5 Guardrails

5.5.1 Guardrails shall be constructed (1) of wood, tubular pipe, or other solid material which is suitable for their intended use; (2) with a 2-inch by 4-inch wood or 1-1/2-inch diameter pipe top rail located approximately 42 inches (+/- 3 inches) above the floor, platform, runway, ramp, or ground; (3) with a 1-inch by 6-inch wood or 1-1/2 inch diameter pipe intermediate rail located approximately halfway between the top rail and the floor, platform, runway, ramp, or ground; and when required

(4) a 1-inch by 4-inch toeboard located not more than 1/4-inch above the floor, platform, runway, ramp, or ground.

5.5.2 Guardrails shall be supported by 2-inch by 4-inch wood or 1-1/2-inch diameter pipe posts, or other solid material, spaced not to exceed 8 feet. The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure is capable of withstanding a 200 pound force applied in a lateral or downward direction within 2 inches of the top edge.

5.5.3 The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

5.6 Safety Signs

5.6.1 General - There shall be no variation in the design of Safety Signs posted to warn of specific dangers and radiation hazards. All signs shall be furnished with rounded or blunt corners and shall be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or other fastening devices shall be located in such a way that they do not constitute a hazard. All signs shall be conspicuously posted in a location readily visible to personnel preparing to enter an area requiring the sign.

1. Danger Signs shall be used where an immediate hazard exists. Danger Signs shall have red as the predominating color: red upper panel, black outline letters and borders, and a white lower panel for additional black-letter wording.

NOTE: **Employees shall be instructed that danger signs indicate <u>immediate danger</u> and that <u>special precautions</u> are necessary.**

EXAMPLES: **DANGER - Asbestos Regulated Area, DANGER - High Voltage, DANGER - Do Not Operate.**

2. Caution Signs shall be used to warn against potential hazards or to caution against unsafe operations. Caution Signs shall have yellow as the predominating color: black upper panel and borders, yellow-letter "CAUTION" (on the

black panel), and a yellow lower panel for additional black-letter wording.

NOTE: Employees shall be instructed that caution signs indicate a possible hazard against which proper precautions should be taken.

EXAMPLES: **CAUTION - Hard Hat Area, CAUTION - Slippery When Wet, CAUTION - Men Working Overhead.**

3. Instructional Signs shall be used to convey general instructions and suggestions. Instruction Signs shall have green as the predominating color: green upper panel, white letters, and a white lower panel for additional black-letter wording.

4. Directional Signs shall be used to convey directional information. Directional Signs shall have white as the predominating color: black upper panel, white directional symbol, and a white lower panel for additional black-letter wording.

5. Exit Signs shall be used to identify emergency fire exits. Exit Signs shall be lettered in legible red letters, not less than six inches high, on a white field and the principal stroke of the letters shall be at least 3/4 inch in width.

6. Biological Hazard Signs shall be used to identify the actual or potential presence of a biohazard and/or identify equipment, containers, rooms, materials, and/or experimental animals which contain or are contaminated with a viable hazardous agent. Biological Hazard Signs shall have fluorescent orange or orange/red as the predominating color, with a contrasting color or black letters and/or symbols.

NOTE: **The term "biological hazard" and "biohazard" shall include only those infectious agents presenting an actual or potential risk to human well-being.**

7. Radiation Hazard Signs shall be used to identify radiation hazards. Radiation Hazard Signs shall have magenta or purple as the predominating color, with yellow letters and/or symbols.

5.6.2 Street Signs - Street Signs shall be posted to advise motorist of construction activity and/or hazards on or adjacent to the roadway. The design of Street Signs shall conform to the requirements of ANSI D6.1 - (latest revision), "Manual on Uniform Traffic Control Devices for Streets and Highways". Street Signs shall have a standard size of 48 inches by 48 inches, shall be the standard diamond shape, shall have a black message and border, and shall have an orange background. The message on Street Signs shall have a minimum letter size of five inches. Street Signs shall be supported by a stable base not easily blown over by the wind or traffic.

1. Construction Area and Advance Construction Area Signs shall be used to advise vehicle operators of construction activities adjacent to the roadway.

2. Road Work and Advance Road Work Signs shall be used to advise vehicle operators of construction activities on the roadway.

3. Detour and Advance Detour Signs shall be used to advise vehicle operators of a road detour.

4. Road Closed and Advance Road Close Signs shall be used to advise vehicle operators of a road closure.

5. Flagman and Advance Flagman Signs shall be used to advise vehicle operators when a flagman is used to control/direct traffic through a construction area on or adjacent to the roadway. Flagman shall wear a red or orange warning vest. Vests worn at night shall be of a reflectorized material.

5.7 Safety Tags

5.7.1 Safety Tags shall be used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc. Safety Tags shall not be used in place of or as a substitute for Safety Signs.

Safety Tags shall contain a signal word and a major message. The signal word shall be either "Danger," "Caution," "Biological Hazard," "BIOHAZARD," or the biological hazard symbol. The major message shall indicate the specific hazardous condition or the instruction to be communicated to the employee. The signal word shall be readable at a minimum distance of five feet (1.52 m) or greater as warranted by the hazard. The tag's major message shall be presented in either pictographs, written text, or both. The signal word and the major message shall be understandable to all employees who may be exposed to the identified hazard. All employees shall be informed as to the meaning of the various tags used throughout the workplace and what special precautions are necessary. Tags shall be affixed as close as safely possible to their respective hazards by a positive means such as string, wire, or adhesive that prevents their loss or unintentional removal.

5.7.2 Danger tags shall be used in major hazard situations where an immediate hazard presents a threat of death or serious injury to employees.

5.7.3 Caution tags shall be used in minor hazard situations where a non-immediate or potential hazard or unsafe practice presents a lesser threat of employee injury.

5.7.4 Warning tags may be used to represent a hazard level between "Caution" and "Danger," instead of the required "Caution" tag, provided that they have a signal word of "Warning," an appropriate major message, and otherwise meet the general criteria of paragraph 5.6.

5.7.5 Biological hazard tags shall be used to identify the actual or potential presence of a biological hazard and to identify equipment, containers, rooms, experimental animals, or combinations thereof, that contain or are contaminated with hazardous biological agents.

5.7.6 Other tags may be used in addition to those required by this procedure or in other situations where this procedure does not require tags, provided that they do not detract from the impact or visibility of the signal work and major message of any required tag.

6.0 REFERENCES

6.1 Occupational Safety and Health Administration (OSHA) Regulation 29 CFR 1910.23, "Guarding Floor and Wall Openings and Holes."

6.2 OSHA Regulations 29 CFR 1910.144, "Safety Color Code for Marking Physical Hazards."

6.3 OSHA Regulations 29 CFR 1910.145, "Specifications for Accident Prevention Signs and Tags."

6.4 OSHA Regulations 29 CFR 1926.200, "Accident Prevention Signs and Tags."

6.5 OSHA Regulations 29 CFR 1926.202, "Barricades."

6.6 OSHA Regulations 29 CFR 1926.500, "Guardrails, Handrails, and Covers."

6.7 American National Standards Institute (ANSI) A10.2 - (latest revision), "Safety Code for Building Construction."

6.8 ANSI D6.1 (latest revision), "Manual on Uniform Traffic Control Devices for Streets and Highways."

6.9 ANSI Z35.1 - (latest revision), "Specifications for Accident Prevention Signs."

6.10 ANSI Z35.2 - (latest revision), "Specifications for Accident Prevention Tags."

6.11 ANSI Z53.1 - (latest revision), "Safety Color Coding for Marking Physical Hazards."

6.12 ANGRC Procedure HSP-2, "Confined Space Entry Procedure."

1.0 PURPOSE

The purpose of this procedure is to provide guidelines to ensure the safety of personnel working in areas where the potential for falls from elevated surfaces exist.

2.0 SCOPE

This procedure applies to all ANGRC employees and subcontractors.

3.0 DEFINITIONS

3.1 Body belt - a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline or deceleration device. The body belt shall be used for fall prevention only and not as part of a fall arrest system.

3.2 Body harness - straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to a lanyard, lifeline or deceleration device.

3.3 Deceleration device - any mechanism which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

3.4 Fall arrest system - consists of an anchorage, connectors, body harness, and may include a lanyard, deceleration device, lifeline or suitable combination of these.

3.5 Floor hole - an opening measuring less than 12 inches but more than 1 inch in its least dimension in any floor, roof, or platform through which materials but not persons may fall.

3.6 Floor opening - an opening measuring 12 inches or more in its least dimension in any floor, roof, or platform through which persons may fall.

3.7 Free fall - the act of falling before a fall arrest system begins to apply force to arrest the fall.

3.8 Unprotected sides and edges - any side or edge of a walking/working surface, where there is no wall or guardrail system at least 39 inches high.

3.9 Wall opening - An opening at least 30 inches high and 18 inches wide, in any wall or partition, through which persons may fall.

4.0 RESPONSIBILITIES

4.1 Supervisor/Field Manager - Responsible for:

- ensuring compliance with this procedure;
- ensuring personnel are trained in accordance with section 6.0; and
- ensuring adequate fall arrest equipment is onsite and in good working order.

4.2 Health and Safety Coordinator (HSC) - Responsible for performing worksite inspections to ensure compliance with this procedure and providing technical assistance during project planning to ensure the best method for fall protection is utilized.

5.0 PROCEDURE

5.1 Employees working on surfaces with a side or edge which is 6 feet or more above a lower level shall be protected from falling.

5.2 Employees working on the edge of excavations deeper than 6 feet with sides sloped less than 1 1/2 to 1 shall be provided fall protection.

5.3 Fall protection shall be provided by either guardrail systems or fall arrest systems. The use of guardrail systems or other engineering controls shall be the preferred method and should be attempted first. If guardrails or other engineering controls are not feasible, a fall arrest system shall be utilized.

5.4 Guardrail Systems

5.4.1 Guardrails shall consist of the following:

- Top rail, 42 inches plus or minus 3 inches above the surface.
- Midrail, midway between the toprail and the surface, or screen extending from the top rail to the surface.

5.4.2 Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds applied within 2 inches of the top edge. When

applied in a downward direction, the top edge shall not deflect to a height less than 39 inches.

5.4.3 For wood railings the top rails and posts shall be at least 2 inch by 4 inch lumber, with posts spaced not more than 8 feet on center, and the midrail shall be at least 1 inch by 6 inch lumber.

5.4.4 For pipe railings: posts, top rails, and midrails shall be at least 1 1/2 inches nominal diameter (schedule 40 pipe) with posts spaced not more than 8 feet apart on centers.

5.4.5 Toeboards or screens shall be installed when there is a potential for material to fall onto personal on a lower level. Toe boards shall be a minimum of 3 1/2 inches high, installed with a maximum clearance of 1/4 inch above the surface.

5.5 Fall Arrest Systems

5.5.1 All fall arrest equipment shall meet the requirements of 29 CFR 1926.502(d) and be ANSI approved.

5.5.2 All fall arrest equipment shall be inspected before each use. Equipment that shows evidence of damage must be immediately tagged "Do Not Use".

5.5.3 All fall arrest equipment used in a fall must be immediately turned over to the HSC.

5.5.4 Body belts may not be used in fall arrest systems.

5.5.5 Snaphooks shall be a locking type designed to prevent accidental disengagement.

5.5.6 Double lanyard systems shall be required if disengagement of a lanyard is required for employee movement. At least one lanyard shall remain connected at all times during movement.

5.6 Warning Line Systems

5.6.1 Warning line systems shall be utilized to inform personnel they are nearing an unprotected edge.

5.6.2 Warning line systems shall be erected not less than 6 feet from the unprotected edge.

5.6.3 Warning line systems shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:

- The line shall be flagged at not more than 6 foot intervals with high-visibility material or a high-visibility tape or ribbon at least 2 1/2 inches wide.

- The line shall be suspended in such a way that its lowest point is no less than 34 inches and its highest point no more than 39 inches;

- The stanchions with line attached shall be capable of resisting, without tipping over, a force of at least 16 pounds applied horizontally 30 inches above the surface.

- The line shall have a minimum tensile strength of 500 pounds.

- The line shall be secured to the stanchions in such a way that pulling on one section will not result in slack being pulled from other sections before the stanchion tips over.

5.7 Floor, Roof and Wall Openings

5.7.1 All floor openings shall be guarded by a standard guardrail or cover. Covering shall be secured in place to prevent accidental removal or displacement; and shall be labeled "Opening - Do Not Remove."

5.7.2 Ladderway floor openings or platforms shall be guarded by standard railings with standard toeboards on all exposed sides, except at entrance to opening, with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.

5.7.3 Whenever there is a danger of falling through a skylight opening, it shall be guarded by a fixed standard guardrail or cover capable of sustaining the weight of a 200-pound person.

5.7.4 Wall openings, from which there is a drop of more than four feet, and the bottom of the opening is less than three feet above the working surface, shall be guarded with a standard guardrail.

6.0 TRAINING

6.1 All employees shall be trained in the following areas:

- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- The use and operation of guardrail systems, fall arrest systems, warning line systems, and other protection to be used; and
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.

6.2 Employees shall be retrained when:

- changes in the workplace render previous training obsolete;
- changes in the types of fall protection systems or equipment to be used render previous training obsolete; or
- inadequacies in an employees actions, regarding the requirements of this procedure, indicate that the employee has not retained the initial training or did not comprehend the importance of it.

7.0 RECORDS

Training attendance shall be recorded and maintained in the employee records. The record shall contain the name, social security number, employer's name, date of training and the signature of the person who conducted the training.

8.0 REFERENCES

OSHA 29CFR1926 Subpart M - Fall Protection

9.0 ATTACHMENTS

None

1.0 PURPOSE

This procedure has been developed to provide the minimum requirements relative to temporary facilities. Deviations from these guidelines must be coordinated through the Health and Safety Manager. Deviations from location requirements require approval by the Base or Facility site selection organization. Notification to the local fire protection service must also be required for all deviations.

2.0 SCOPE

This procedure applied to all temporary facilities on ANGRC controlled projects.

3.0 DEFINITIONS

3.1 **Temporary Facilities** - Structures established for the support of field operations, which will be removed or dismantled when the project is complete.

4.0 RESPONSIBILITIES

4.1 **Supervisors** - ANGRC and subcontractors supervisors are responsible to ensure that temporary facilities on projects are constructed and set up in accordance with this procedure.

4.2 **Health and Safety Coordinator (HSC)** - The HSC is responsible for conducting periodic surveillance to ensure compliance with all requirements of this procedure.

5.0 PORTABLE STRUCTURE LOCATION

5.1 Each temporary, portable structure location must be approved by the Ogden Construction Supervisor/Field Manager. This process needs to be initiated at the earliest opportunity.

5.2 Portable structures separation distances are dependent on local fire protection services requirements. In general, portable structures must be separated by a distance of 35 feet. This distance may be reduced to 10 feet for portable structures having an automatic sprinkler system.

Additional Separation Requirements:

- 10 feet from a fire hydrant, fire department connection and other fire fighting equipment.

- 25 feet from overhead natural gas lines or other fuel lines.

- 25 feet from electrical power and alarm lines unless approval is given by the Base or Facility site selection organization.

5.3 Locations must permit emergency vehicles to operate within 100 feet of the portable structure.

5.4 Subject structures shall not be located over control valves, manholes, storm drains, and other utility equipment requiring access.

5.5 Subject structures shall not interfere with any exit necessary for life safety or any fire lane.

5.6 Subject structures shall not be located beneath non-sprinkled overhangs of existing buildings unless approved by the local Fire Protection Group.

6.0 CONSTRUCTION AND SET-UP

6.1 Combustible materials of wood products may be used for structures located with required distances provided:

- Operations within the structure do not involve hot work activities, and

- Smoking is not allowed inside the structures, and

- Temporary heating is not allowed

6.2 Polyethylene plastic shall be of the fire-retardant type. Tarps used shall be listed as non-combustible.

6.3 Stairs shall be provided at all personnel points of access where there is a break in elevation of 19 inches or more. The stairs shall be in accordance with the following:

- Shall be installed between 30° and 50° from horizontal.

- Shall have uniform riser height and tread depth.

- Shall have a landing of not less than 30 inches in the direction of travel and at least 22 inches wide. Where doors open directly on a stairway, the swing of the door shall not reduce the effective width of the platform to less than 20 inches. The platform shall be level with the floor of the structure.

- A non-skid surface shall be applied to steps and the platform floor.

- Stairways rising more than 30 inches shall have hand rails and stair rails along each unprotected side or edge.

6.4 Storage of materials beneath portable structures is prohibited.

6.5 All wheeled (previously mobile) portable structures with the exception of semi-truck trailers that are elevated above grade must be anchored and supported to prevent sliding and overturning according to ANSI A225.1 and NFPA 501A.

6.6 Each portable structure must be identified by a readily visible sign containing the name of the company/occupant and telephone number of a responsible individual who can be reached at one of the listed numbers at all times including off-shifts and weekends.

6.7 Facility utility connections shall be approved by appropriate Base or Facility utility department.

6.8 Wood floors of structures where metal cutting, welding, or other hot work is to be performed shall be sheathed with a metal cover.

7.0 LIFE SAFETY AND FIRE PROTECTION

7.1 All exit doors shall be maintained in a workmanship manner. Broken glass must be replaced. All exits shall have a clear width of 32 inches.

7.2 The location of fire alarms and emergency notification equipment must be identified for those who use and/or occupy the structures.

7.3 At least one 10 pound ABC fire extinguisher shall be provided for each facility. Travel distance from any one point within the structure to the nearest fire extinguisher shall not exceed 75 feet. Access to fire extinguishers must remain clear at all times.

7.4 Portable heat devices such as coffee pots, hot plates, ovens, and similar devices shall be shut-off or disconnected during non-working hours, except where timers are utilized. All nonessential electrical circuits shall be deenergized during non-working hours by a breaker or switch conveniently located at the primary exit of the structure.

7.5 Propane heaters may be used subject to approval from the Base or Facility Fire Protection Group and the following restrictions:

- Propane supply shall be limited to one bottle having capacity of a maximum of 100 lbs. No reserve supply is to be stored in the structure.
- Heaters shall not be left on and unattended for extended periods of time during the workday and never left on nights, weekends, or holidays.
- Propane cylinder shall be secured to prevent falling over and shall be located exterior to the structure.

8.0 RECORDS

None

9.0 REFERENCES

9.1 OSHA 29 CFR 1926 "Safety and Health Regulations for Construction"

9.2 ANSI A225.1

9.3 NFPA 101 "Life Safety Code"

9.4 NFPA 501A "Standard for Firesafety Criteria for Manufactured Home Installations, Sites, and Communities"

Approved/Date

CONTROL OF MEASURING AND TEST EQUIPMENT

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

This procedure describes the activities and responsibilities of the ANGRC IRP Program organization pertaining to the calibration of measuring and test equipment (M&TE).

2.0 SCOPE

This document applies to all personnel in the ANGRC IRP Program involved with the calibration and control of measuring and test equipment.

These calibration and control measures do not apply to rules, tape measures, levels, or other such devices when normal commercial standards provide acceptable accuracy.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP Program. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

3.1 ACCURACY

A measure of the degree to which the actual output of a device approximates the output of an ideal device performing the same function.

3.2 CALIBRATION

Comparison and standardization of measurement devices against reference standards of known and documented intensity or concentration to improve the accuracy and precision of readings of measurement devices.

3.3 Measuring Equipment

Devices or systems used to quantify, gauge, test, inspect, or control in order to acquire data or determine compliance with project specifications or other technical requirements.

3.4 Operational Check

An inspection of an instrument to determine it is working consistently and whether it appears to be in good condition. An operational check is not a substitute for calibration.

3.5 Custodian

The organization or individual responsible for the calibration, maintenance, and repair of specific items of M&TE.

4.0 RESPONSIBILITIES

The Program Manager is responsible for ensuring overall compliance with this procedure.

The M&TE Coordinator is responsible for maintaining the Master M&TE log and for issuing calibration recall notices when required.

The custodian is responsible for performing or obtaining calibration of M&TE in accordance with applicable requirements.

The Project Manager (PM) is responsible for control and ensuring calibration of all M&TE utilized on the project.

All personnel are responsible for verifying the calibration status of M&TE prior to each use.

5.0 PROCEDURE

The Program Manager, shall select an individual to serve as M&TE Coordinator (coordinator) for the organization.

The coordinator shall develop and maintain a master M&TE log which shall address the following, as applicable, for each item of M&TE:

- Type of instrument;

- Manufacturer;
- Model number;
- Manufacturer's serial number;
- Unique identification number;
- Calibration frequency;
- Calibration procedure number;
- Date of last calibration;
- Next calibration due date; and custodian.

Each item of M&TE shall be uniquely identified, and the identification shall be permanently marked on the item. If the item itself cannot be marked with the identification number, a method shall be developed to ensure positive identification of the item for traceability to calibration and usage records.

Each item of M&TE shall be calibrated prior to being placed into service, after repair, and periodically in accordance with the program requirements.

Calibration frequencies shall be determined by the custodian based on manufacturer's recommendations and the anticipated use of the item, including activities and environment.

The coordinator shall develop and implement an M&TE recall system to notify affected personnel when an item of M&TE is scheduled for recalibration.

The holder of M&TE that is recalled for calibration shall return it to the custodian for calibration.

The custodian shall ensure that the M&TE is calibrated in accordance with applicable procedures and that appropriate records are retained to include the "as-found" and "as-left" conditions of the item, when applicable.

The custodian shall review calibration results for acceptability and shall compare previous calibration data to evaluate possible adverse trends related to the item.

Calibration standards shall be traceable to reference standards such as the National Institute of Standards and Technology (NIST) or other recognized standards.

Evidence (such as a label) of calibration and the due date of the next calibration shall be attached to each item following calibration. If such identification is not practical, a method shall be developed to ensure that the user can ascertain the calibration status of the item.

M&TE which requires daily or prior-to-use calibration does not require calibration labels.

An item of M&TE that is found to be out of calibration or is suspected of being damaged or inaccurate shall be clearly identified and segregated from normal accessibility until the item or condition is properly dispositioned.

If an item of M&TE is found to be out of calibration, all data obtained with the item since its previous calibration shall be evaluated to assess the potential impact of inadequate M&TE on previously performed activities. The results of the evaluation shall be documented.

Custodians shall maintain issue logs for M&TE under their responsibility. The log shall include the unique identification number of the item, to whom it was issued, and the activity for which it was issued. These data are required for traceability of the item to an activity in the event that the M&TE is later found to be out of calibration.

Upon receipt of leased M&TE, a functional or calibration check, as applicable to the type of equipment, shall be performed to ensure that the M&TE is satisfactory for the intended use.

If the M&TE is found to be unsatisfactory, the condition shall be documented and the M&TE returned to the source.

After use, and prior to returning the M&TE to its source, a functional or calibration check, as applicable, shall be performed to provide assurance that the data obtained was valid.

Leased M&TE that is retained for long-term use (longer than the duration of the normal recalibration cycle) shall be entered into the Master M&TE Log. Calibration control shall be exercised as if it were owned M&TE.

6.0 RECORDS

Calibration records shall be maintained by the custodian for a minimum of five calibration cycles.

Issue logs shall be maintained for sufficient duration to ensure the ability to maintain traceability of M&TE usage should calibration status be in doubt.

Results of evaluations performed related to M&TE found to be out-of-calibration shall become a part of the applicable project documentation.

7.0 REFERENCES

Logbooks FP-F-5

8.0 ATTACHMENTS

None.

CALIBRATION PROCEDURES

Approved/Date

E. Griff Wyatt, P.E.
ANGRC IRP Program Manager

1.0 PURPOSE

This document contains the procedures used by ANGRC IRP personnel for calibration of measuring and test equipment (M&TE).

2.0 SCOPE

This procedure is applicable to personnel performing calibration activities for the described M&TE.

This procedure has been developed to serve as management-approved professional guidance for the ANGRC IRP Program. As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgement to accommodate unforeseen circumstances. Deviance from this procedure in planning or in the execution of planned activities must be approved by management personnel and documented.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

Personnel assigned to perform calibration activities are responsible for complying with the applicable instructions, and initiating applicable records.

5.0 PROCEDURE

Specific calibration procedures are contained in the attachments to this procedure.

The specific calibration procedure to be used for each item of M&TE is listed in the Master M&TE Log.

6.0 RECORDS

Records shall be generated as described in Procedure ANGRC IRP.

7.0 REFERENCES

ANCRC IRP - FP - A-1, Control of Measuring and Test Equipment

8.0 ATTACHMENTS

1. Calibration Procedure for Foxboro Model OVA 128, Century Organic Vapor Analyzer

2. Calibration Procedure for Bruel & Kjaer Precision Sound Level Meter, Type 2232

3. Calibration Procedure for Eberline Smart Portable Detection Meter, Model ASP-1

4. Calibration Procedure for MSA Combustible Gas and Oxygen Meter, Model 260

5. Calibration Procedure for PhotoVac Microtip II PID, Model HL200

6. Calibration Procedure for Thermo Environmental Instruments, OVM/Datalogger, Model 580B

7. Calibration Procedure for MIE Miniram Personal Aerosol Monitor, Model PDM-3

8. Calibration Procedure for Industrial Scientific Combustible Gas and Oxygen Monitor, Model MX251.

9. Calibration Procedure for Industrial Scientific Combustible Gas, Oxygen, and Hydrogen Sulfide Monitor, Model HMX271

ATTACHMENT 1

OPERATION AND CALIBRATION PROCEDURE FOR OVA 128 ORGANIC VAPOR ANALYZER

OPERATING PROCEDURES

1. Connect the Probe/Readout Assembly to the Sidepack Assembly by attaching the sample line and electronic jack to the Sidepack. Hand tighten sample line.

2. Select the desired sample probe and connect the probe handle. Before tightening the knurled nut, check that the probe accessory if firmly seated against the flat seals in the probe handle and in the tip of the telescoping probe.

3. Move the Instr/Batt Switch to the test position. The meter needle should move to a point beyond the white line, indicating that the battery has more than 4 hours of operating life before recharging is necessary.

4. Move the Instr/Batt Switch to the "ON" position and allow 2 minutes to warm-up.

5. Turn the Pump Switch on.

6. Move the Calibrate Switch to X1 and adjust the meter reading to 1 using the Calibrate Adjust (zero knob).

7. Open the Hydrogen Tank Valve 1 or 2 turns and observe the reading on the Hydrogen Tank Pressure Indicator.

8. Open the Hydrogen Tank Valve 1 or 2 turns and observe the reading on the Hydrogen Supply Pressure Indicator.

9. After approximately one minute, depress the Ignitor Button until the hydrogen flame lights. The meter needle will travel upscale and begin to read "Total Organic Vapors". Caution: Do not depress igniter for more than 6 seconds. If flame does not ignite, wait one minute and try again.

10. The instrument is ready for use. NOTE: To avoid false flame-out alarm indication, set meter to 1 ppm with Calibrate Knob and make differential readings from there.

CALIBRATION

1. The instrument is calibrated using a specific mixture of gas, with a known concentration. (95 ppm methane is normally used.)

2. After the instrument is in normal operation, and the normal background is zeroed, fill a gas bag with a known concentration methane.

3. Draw a sample of the calibration gas from the gas bag into the instrument.

4. The GAS SELECT Knob on the panel is then used to set the readout meter indication to correspond to the concentration of the calibration gas mixture.

5. The instrument is now calibrated.

FUEL REFILLING

1. The instrument and the charge should be completely shut down during hydrogen tank refilling operations. Refilling should be done in a well ventilated area. THERE SHOULD BE NO POTENTIAL IGNITERS OR FLAMES IN THE AREA.

2. Attach the filling hose to the hydrogen supply tank and then connect the hose to the refill connection on the Side Pack Assembly.

3. Open the hydrogen supply tank valve and the FILL/BLEED Valve to the BLEED position and bleed the line.

4. Open the REFILL VALVE and the HYDROGEN TANK VALVE on the OVA and open the FILL/BLEED Valve into the FILL position.

5. After the instrument fuel tank is filled, close the REFILL VALVE on the panel, the FILL/BLEED Valve on the filling hose assembly and the hydrogen supply bottle valve.

6. The hydrogen trapped in the hose should now be bled off to atmospheric pressure. CAUTION should be used in this operation since the hose will contain a significant amount of hydrogen at high pressure.

BATTERY CHARGING

1. Plug charge connector into mating connector on battery cover and inlet ac plug into 115 V ac wall outlet.

2. Move the battery charge switch to the ON position. The lamp above the switch button should illuminate.

3. Approximately one hour of charging time is required for each hour of operation. However, an overnight charge is recommended. The charge can be left on indefinitely without damaging the batteries.

ATTACHMENT 2

CALIBRATION PROCEDURE FOR BRUEL & KJAER PRECISION SOUND LEVEL METER, TYPE 2232

1. Remove the Windscreen and Random Incidence Corrector, if fitted.

2. Remove the small plastic plug from the front panel directly below the microphone, giving access to the SENSITIVITY ADJUSTMENT trimmer.

3. Set the controls as follows:

RANGE SELECTOR	"70 - 130 dB(A)"
DETECTOR RESPONSE:	"Fast"
RESET:	"Auto"
POWER:	"Off"

4. Place the Sound Level Calibrator over the microphone and turn it on.

5. Switch the power on. The display momentarily shows "BAT 188.8". This is a display function check.

6. Using a small screwdriver, adjust the SENSITIVITY ADJUSTMENT trimmer to obtain a reading of 93.8 dB(A) on the sound level meter display.

7. Remove the calibrator gently and replace the plastic plug over the adjustment trimmer.

ATTACHMENT 3

CALIBRATION PROCEDURE FOR EBERLINE SMART PORTABLE DETECTION METER, MODEL ASP-1

1. Set the input sensitivity with the THRESH and GAIN controls.

2. Set the high voltage with the HV ADJ control.

3. Set the CAL switches and CAL control at a low exposure rate.

4. Set the DEAD-TIME switches at a high exposure rate.

5. Set the "per unit time" switches to obtain an on-scale reading.

6. Set the SPEAKER RATE DIV switches to obtain an on-scale reading.

7. Confirm or revise the data on the calibration label on the ASP-1 can.

ATTACHMENT 4

CALIBRATION PROCEDURE FOR MSA COMBUSTIBLE GAS AND OXYGEN METER, MODEL 260

NOTE: Use the manufacturer's instruction manual provided with this meter for reference as required during the performance of this procedure.

1. Open the instrument lid. Turn the center ON-OFF to the far right HORN-OFF position. Both meter pointers will move and one or both alarm lights may light.

2. If the % oxygen meter pointer stabilizes at a value other than 20.8%, the pointer should be set 20.8% by using the CALIBRATE O_2 control.

3. The % LEL meter pointer should be set to zero by adjusting the ZERO LEL control.

4. If either of the alarm lights are lit, press the Alarm Reset button.

5. Momentarily place a finger over the sample inlet fitting or the end of the sample line probe. Observe that the flow indicator float drops out of sight indicating no flow. If the float does not drop, check out the flow system for leaks as described under Section VII of the manufacture's instruction manual.

6. Press the CHECK button and observe the % LEL meter. The pointer must read at 80% LEL or higher as marked by the BATTERY zone on the meter. If the pointer reading is less, the batteries must be recharged. No tests should be attempted as the instrument will not perform properly. See Section VI of the manufacturer's instruction manual for battery charging instructions.

7. If it is desired that the audible alarm sound for combustible gas or low oxygen concentrations, turn the center ON-OFF control back one position to the ON setting.

8. Accessory equipment such as sampling lines, probes, carrying harness, filters or line traps should be attached as required.

9. The instrument is ready for atmospheric sampling.

ATTACHMENT 5
CALIBRATION PROCEDURE FOR HNU$_{PI}$ 101 ANALYZER.

a. Battery check -- Turn the function switch to BATT. The needle should be in the green region. If not, recharge the battery.

b. Zero set - Turn the function switch to STANDBY. In this position, the lamp is OFF and no signal is generated. Set the zero point with the ZERO set control. The zero can also be set with the function switch on the XI position and using a "Hydrocarbon-free" air. In this case, "negative" readings are possible if the analyzer measures a cleaner sample when in service.

c. 0-20 or 0-200 range -- For calibrating on the 0-20 or 0-200 range, only one gas standard is required. Turn the function switch to the range position and note the meter reading. Adjust the SPAN control setting as required to read the ppm concentration of the standard. Recheck the zero setting (step b). IF readjustment is needed, repeat step c. This repetition gives a two-point calibration; zero and the gas standard point. Additional calibration points can be generated by dilution of the standard with zero air if desired (see Section 8).

d. 0-2,000 range -- For calibrating on the 0-2,000 range, use of two standards is recommended as cited in Section 3.2a. First, calibrate with the higher standard using the SPAN control for setting. Then calibrate with the lower standard using the ZERO adjustment. Repeat these several times to ensure that a good calibration is obtained. The analyzer will be approximately linear to better than 600 ppm, (see Figure 3-2). If the analyzer is subsequently to be used on the 0-20 or 0-200 range, it must be recalibrated as described in steps b and c, above.

e. Lamp cleaning -- If the span setting resulting from calibration is 0.0 or if calibration cannot be achieved, then the lamp must be cleaned (see Section 5.2).

f. Lamp replacement -- If the lamp output is too low or if the lamp has failed, it must be replaced (see Section 5.3).

ATTACHMENT 6

CALIBRATION PROCEDURE FOR PHOTOVAC MICROTIP II PID, MODEL HL 200

1. Connect the supplied regulator to the Span Gas cylinder. Hand tighten the fittings.

2. Open the valve on the gas bag by turning the valve stem fully counterclockwise.

3. Attach the gas bag adapter nut to the regulator. Hand tighten the fittings.

4. Turn the regulator knob counterclockwise about half a turn to start the flow of gas.

5. Fill the gas bag about half full and then close the regulator fully clockwise to turn off the flow of gas.

6. Disconnect the bag from the adapter and empty it. Flush the bag a few times with the Span Gas and then fill it.

7. Close the gas bag by turning the valve clockwise.

8. Press SETUP and select the desired Cal Memory with the arrow keys and press ENTER. Press EXIT to leave Setup.

9. Press CAL and expose Micro TIP to Zero Gas. Press Enter and MicroTIP sets its zero point.

10. MicroTIP then asks for the Span Gas concentration. Enter the known Span Gas concentration and then connect the Span bag adapter to the inlet.

11. Press ENTER and MicroTIP sets its sensitivity.

12. When MicroTIP's display reverts to normal, MicroTIP is calibrated and ready for use. Remove the Span Gas bag from the inlet.

ATTACHMENT 7

CALIBRATION PROCEDURE FOR THERMO ENVIRONMENTAL INSTRUMENTS, INC., OVM/DATALOGGER, MODEL 580B

NOTE: Use the manufacturer's instruction manual provided with this instrument for reference as required during the performance of this procedure.

1. Turn instrument on by plugging in the plug hanging on chain into the port marked RUN/CHG. The digital readout will read LAMP OUT.

2. Press <u>ON/OFF</u> switch and instrument will turn on. You will then hear a humming sound and the instrument will be reading in PPM.

3. Press the <u>MODE/STORE</u> button. It will prompt you - LOG THIS VALUE?

4. Press the <u>-/CRSR</u> button.

5. Press the <u>-/CRSR</u> button again. Will prompt you -CONC. METER "RESET" TO CHG.

6. Press <u>-/CRSR</u>. Instrument will show you how much free space is available.

7. Press <u>-/CRSR</u>. Will prompt you -"RESET" to calibrate.

8. Press <u>RESET</u>. Will prompt you - Restore Backup +=yes.

9. Press <u>-/CRSR</u> -ZERO GAS WHEN READY.

10. Press <u>RESET/</u> Inst. will prompt you - MODEL 580 ZEROING. After zeroing to complete, the Inst. will prompt you- SPAN PPM=0100 "+" TO CONTINUE.

11. Press <u>+/INC</u>. Will prompt you- SPAN GAS <u>RESET</u> WHEN READY. Connect span gas.

12. Press <u>RESET</u>. Will prompt you- MODEL 580 CALIBRATING. Wait until the prompt changes to "RESET" TO CALIBRATE. Disconnect and turn off span gas. Then...

13. Press <u>MODE/STORE</u> to exit calibrating sequence and the instrument will be ready for use.

ATTACHMENT 8

CALIBRATION PROCEDURE FOR MIE MINIRAM PERSONAL AEROSOL MONITOR, MODEL PDM-3

ZEROING PROCEDURE

1. Place Z-bag on flat surface with red flow fitting facing up. Flatten and unzip bag.

2. Insert ribbed elbow connector (attached to filter cartridge) into red flow fitting of plastic bag, until connector is flush with bottom of red flow fitting.

3. MINIRAM should be in its OFF condition (observe display). If display is blanked. or if MINIRAM is in the MEAS mode, key OFF.

4. Open Z-Bag and place MINIRAM inside Z-Bag, approximately at its center.

5. Key ZERO through the open end of the Z-Bag. Immediately zip close the Z-Bag and begin to pump hand bulb.

6. Z-Bag should inflate as hand pumping continues, up to a height of about five inches (12 cm). Continue pumping gently to maintain bag interior pressure, until the MINIRAM displays OFF again.

7. Unzip Z-Bag and remove MINIRAM from it.

8. Store Z-Bag flattened and zipped closed, with ribbed elbow connector plugged-in to ensure cleanliness of the bag interior.

NOTE: If zeroing is to be done in a clean environment (e.g., air conditioned office), the MINIRAM can be zeroed without the use of the Z-Bag.

ATTACHMENT 9

CALIBRATION PROCEDURES FOR INDUSTRIAL SCIENTIFIC COMBUSTIBLE GAS AND OXYGEN MONITOR, MODEL MX 251

NOTE: For best calibration accuracy, the monitor should be allowed to stabilize at room temperature for at least one hour before calibration.

CHECKING ALARM SETTINGS

A. To check LEL

1. Switch display to LEL mode.
2. Slowly turn **Z LEL** adjustment in the clockwise direction until the alarm is activated, then slowly turn the adjustment back and forth through this point.
3. Observe the display. It will show the percent of LEL at which the alarm is set to activate.
4. Turn the adjustment back to the zero display reading. (Factory setting for the alarm is 10%.)

B. To check OX

1. Switch to the OX. Observe and note the display reading, which should be 20.9% in normal room air.
2. Slowly turn the S OX adjustment counterclockwise until the low oxygen alarm setting is found. Turn the adjustment back and forth through the alarm point. It is factory set at 19.5%.
3. Slowly turn the adjustment in the clockwise direction until the high oxygen alarm setting is found. Turn the adjustment back and forth through the alarm point to verify the setting. It is factory set at 23.0%.

ZERO ADJUSTMENT

1. In clean air, switch the display to the LEL mode and adjust the **Z LEL** control by turning it counterclockwise until the minus (-) sign appears on the display.

2. Very slowly turn the **Z LEL** control clockwise until the minus sign just goes off, leaving (000) on the display.

SPAN ADJUSTMENTS

1. Apply span gas of 25% LEL Pentane to the monitor using the calibration cup.

2. Allow the gas to flow for two (2) minutes. With the gas still flowing, adjust the **S LEL** control to read 25%.

3. Remove the calibration gas.

4. In clean air (known to have 20.9% oxygen), the **S OX** control should be adjusted so that the display reads 20.9% oxygen. Read out should be adjusted so that the display reads 20.9%.

ATTACHMENT 10

CALIBRATION PROCEDURES FOR INDUSTRIAL SCIENTIFIC COMBUSTIBLE GAS, OXYGEN, AND HYDROGEN SULFIDE MONITOR MODEL HMX 271

NOTE: For best calibration accuracy, the monitor should be allowed to stabilize at room temperature for at least one hour before calibration.

CHECKING ALARM

A. To check LEL

1. Switch display to LEL mode.

2. Slowly turn **Z LEL** adjustment in the clockwise direction until the alarm is activated, then slowly turn the adjustment back and forth through this point.

3. Observe the display. It will show the percent of LEL at which the alarm is set to activate.

4. Turn the adjustment back to the zero display reading. (Factory setting for the alarm is 10%.)

B. To check H_2S

1. Switch display to the H_2S mode.

2. Slowly turn the **Z PPM** adjustment in the clockwise direction until the alarm is activated, then slowly turn the adjustment back and forth through the point of activation.

3. Observe the display. It will indicate the ppm level at which the H_2S alarm activates. The factory setting for the H_2S alarm is 10 ppm.

C. To check OX

1. Switch to the OX. Observe and note the display reading, which should be 20.9% in normal room air.

2. Slowly turn the S OX adjustment counterclockwise until the low oxygen alarm setting is found. Turn the adjustment back and forth through the alarm point. It is factory set at 19.5%.

3. Slowly turn the adjustment in the clockwise direction until the high oxygen alarm setting is found. Turn the adjustment back and forth through the alarm point to verify the setting. It is factory set at 23.0%.

ZERO ADJUSTMENT

A. Zero H_2S

1. In clean air, switch the display to the H_2S mode and adjust the **Z PPM** by turning it coutnerclockwise until the minus (-) sign appears on the display.

2. Very slowly turn the **Z PPM** control clockwie until the minus sign just goes off, leaving (000) in the display.

B. Zero LEL

1. In clean air, switch the display to the LEL mode and adjust the **Z LEL** control by turning it counterclockwise until the minus sign (-) appears on the display.

2. Very slowly turn the **Z LEL** control clockwise until the minus sign just goes off, leaving (000) in the display.

SPAN ADJUSTMENTS

1. Switch display to the LEL mode, and apply the span gas of 25% LEL Pentane to the monitor using the calibration cup.

2. Allow the gas to flow for two (2) minutes, then adjust the **S LEL** control so that the display reads the percent of LEL printed on the gas canister.

3. Remove the calibration gas.

4. Repeat the procedure for H_2S using a known concentration of H_2S span calibration gas with the **S PPM** control to complete the span calibration.

5. In clean air, the **S OX** control should be adjusted so that the display reads 20.9% oxygen. Read out should be adjusted so that the display reads 20.9%.